

Birla Central Library

PILANI (Jaipur State)

R

Class No :- 547.03

Book No :- H 504 D V. 2

Accession No :- 29995

DICTIONARY OF ORGANIC COMPOUNDS

VOLUME II

DICTIONARY OF ORGANIC COMPOUNDS

THE CONSTITUTION AND PHYSICAL AND CHEMICAL
PROPERTIES OF THE PRINCIPAL CARBON COM-
POUNDS AND THEIR DERIVATIVES, TOGETHER
WITH THE RELEVANT LITERATURE REFERENCES

VOLUME TWO

ECCAINE—MYRTILLIN CHLORIDE

Edited by

SIR IAN HEILBRON, D.S.O., D.Sc., LL.D., F.R.I.C., F.R.S.

*Professor of Organic Chemistry at the Imperial College of
Science and Technology, London*

AND

H. M. BUNBURY, M.Sc., F.R.I.C. *Barrister-at-Law*

Imperial Chemical Industries Ltd.

Assistant Editor

W. E. JONES, Ph.D., B.Sc., A.R.I.C.

Authors

W. DORAN, M.Sc., A.R.I.C., J. L. DUNN, Ph.D., B.Sc.,
D. H. HEY, D.Sc., Ph.D., F.R.I.C., A. LOWE, M.Sc., A.R.I.C.,
A. McGOOKIN, Ph.D., B.Sc., A.R.I.C., R. F. PHIPERS, Ph.D., B.Sc.

Readers

J. W. BATTY, B.Sc., D. H. COFFEY, B.Sc., W. McMEEKING,
Ph.D., B.Sc., A.R.I.C., E. G. PARRY, Ph.D., B.Sc., H. R. WRIGHT,
B.Sc., A.R.I.C., E. T. STILLER, Ph.D., B.Sc., S. R. SWIFT, M.Sc.

1946

LONDON: EYRE & SPOTTISWOODE

First published January 1936
Reprinted (with Supplement) April 1944
" " " *July 1946*

Printed in England for
Eyre and Spottiswoode (Publishers) Ltd.
15, Bedford Street, Strand, London, W.C.2.

TABLE OF ABBREVIATIONS

A	Acid (A_2 , two mols of acid).	I.U.	International Unit.
Å	Angstrom unit. (10^{-8} cm.).	Jap. P.	Japanese Patent.
Abs. EtOH	Absolute alcohol.	k	Dissociation constant.
AcOH	Acetic acid.	l	Levorotatory.
Ac₂O	Acetic anhydride.	Liq.	Liquid.
AcOEt	Ethyl acetate.	m	Meta (position).
Add.	Additive.	Max.	Maximum.
Addn.	Addition.	Me	Methyl.
A.G.F.A.	Aktien-Gesellschaft für Anilinfabrikation.	MeOH	Methyl alcohol.
Alc.	Alcohol, alcoholic.	Me₂CO	Acetone.
Alc. NH₃	Alcoholic ammonia.	Min.	Mineral (inorganic).
Alk.	Alkali, alkaline.	Misc.	Miscible.
[α]	Specific rotation.	M.L.B.	Meister, Lucius, & Brünig.
Amorph.	Amorphous.	mm.	Millimetres.
Anhyd.	Anhydrous.	Mod.	Moderately.
Aq.	Aqueous.	Mol.	Molecule, molecular, molar.
Atm.	Atmosphere(s), atmospheric.	M.p.	Melting point.
B	Base (B_2 , two mols of base).	ms	Meso (position).
Badische	Badische Anilin und Sodafabrik.	MW	Molecular weight (formula weight).
Belg. P.	Belgian Patent.	mgm.	Milligramme(s).
B.D.C.	British Dyestuffs Corporation.	mμ	Millimicron. (10^{-7} cm.).
Bibl.	Bibliography.	n	Normal (chain).
B.p.	Boiling point.	n_D	Refractive index (D line, etc.).
C_p	Constant pressure.	NaHg	Sodium amalgam.
C_v	Constant volume.	NH₃	Ammonia, aqueous ammonia.
Cal.	Calories.	NH₃.AgNO₃	Ammoniacal silver nitrate.
Can. P.	Canadian Patent.	o	Ortho (position).
Col.	Colour, coloration.	Ord.	Ordinary.
Comb.	Combustion.	Org.	Organic.
Comp.	Compound.	Ox.	Oxidise, oxidation.
Conc.	Concentrated.	p	Para (position).
Corr.	Corrected.	P	Patent.
Crit.	Critical.	Part.	Partly, partial.
Cryst.	Crystals, crystalline, crystallise.	Pet. ether	Petroleum ether.
(COOH)₂	Oxalic acid.	PhNO₂	Nitrobenzene.
(CH₂COOH)₂	Succinic acid.	PhOH	Phenol.
D	Density.	Ppd.	Precipitated.
d	Dextrorotatory.	Ppt.	Precipitate.
dl	Racemic. Optically inactive by external compensation.	Pptn.	Precipitation.
Decomp.	Decomposed, decomposition.	Prac.	Practically.
Deriv.	Derivative.	Press.	Pressure(s).
Dil.	Dilute, dilution.	ψ	Pseudo.
Diss.	Dissolves, dissolved.	Py	Pyridine.
Dist.	Distil, distillation.	r	Racemic.
D.R.P.	German Patent.	Red.	Reduce, reduction.
E.P.	English (British) Patent.	Ref.	Reference.
Et	Ethyl.	Russ.P.	Russian Patent.
Et₂O	Ether (diethyl ether).	S.C.I.	Société pour l'industrie chimique à Basle.
EtOH	Ethyl alcohol.	Sec.	Secondary.
Fluor.	Fluoresces, fluorescence.	Sol.	Soluble, solution.
F.p.	Freezing point.	Spar.	Sparingly.
F.P.	French Patent.	Sp. gr.	Specific gravity.
Form.	Formation.	Sp. heat	Specific heat.
γ	10^{-6} gm. or 10^{-8} mgm. (microgrammes).	Suppl.	Supplement.
gm.	Gramme(s).	Sym.	Symmetrical.
Hyd.	Hydrolyses, hydrolysed, hydrolysis.	Temp.	Temperature(s).
i	Optically inactive by internal compensation.	Tert.	Tertiary.
I.C.I.	Imperial Chemical Industries.	Undecomp.	Undecomposed.
I.G.	Interessen Gemeinschaft Farbenindustrie Aktien-Gesellschaft.	Unsym.	Unsymmetrical.
Insol.	Insoluble.	UV.	Ultraviolet.
		Vac.	Vacuum.
		Vap.	Vaporisation.
		Vol.	Volume.

JOURNAL ABBREVIATIONS

Journals not listed here are given their full titles in the text.

<i>Acta Phytochim.</i>	Acta Phytochimica (Japan).	<i>Chem. Trade J.</i>	Chemical Trade Journal (and Chemical Engineer).
<i>Am. Chem. J.</i>	American Chemical Journal.	<i>Chem. Umschau</i>	Chemische Umschau (auf dem Gebiete der Fette, Oele, Wachse, und Harze). Now Fettchemische Umschau.
<i>Am. J. Pharm.</i>	American Journal of Pharmacy.	<i>Chem. Weekblad</i>	Chemisch Weekblad.
<i>Am. J. Sci.</i>	American Journal of Science.	<i>Chem. Zentr.</i>	Chemisches Zentralblatt.
<i>Anales soc. españ. fis. quim.</i>	Anales de la sociedad española de física y química.	<i>Chem.-Ztg.</i>	Chemiker-Zeitung.
<i>Angew. Chem.</i>	Angewandte Chemie.	<i>Compt. rend.</i>	Comptes rendus (hebdomadaires des séances de l'académie des sciences).
<i>Ann.</i>	Annalen der Chemie.	<i>Compt. rend. acad. sci. U.R.S.S.</i>	Comptes rendus de l'Académie des Sciences de l'U.R.S.S.
<i>Ann. chim.</i>	Annales de chimie.	<i>Compt. rend. soc. biol.</i>	Comptes rendus des séances de la société de biologie.
<i>Ann. chim. applicata</i>	Annali di chimica applicata.	<i>Dinglers polytech. J.</i>	Dinglers polytechnisches Journal.
<i>Ann. chim. phys.</i>	Annales de chimie et de physique.	<i>Fettchem. Umschau</i>	Fettchemische Umschau.
<i>Ann. phys.</i>	Annales de physique.	<i>Gazz. chim. ital.</i>	Gazzetta chimica italiana.
<i>Ann. Physik</i>	Annalen der Physik.	<i>Giorn. chim. applicata</i>	Giornale di chimica applicata.
<i>Ann. Rev. Biochem.</i>	Annual Review of Biochemistry.	<i>Giorn. chim. ind.</i>	Giornale di chimica industriale.
<i>Arch. Pharm.</i>	Archiv der Pharmazie (und Berichte der deutschen pharmazeutischen Gesellschaft).	<i>Giorn. chim. ind. applicata</i>	Giornale di chimica industriale ed applicata.
<i>Arkiv Kemi, Mineral. Geol.</i>	Arkiv för Kemi, Mineralogi och Geologi.	<i>Helv. Chim. Acta</i>	Helvetica Chimica Acta.
<i>Atti accad. Lincei</i>	Atti della reale accademia nazionale dei Lincei.	<i>Ind. Eng. Chem.</i>	Industrial and Engineering Chemistry.
<i>Ber.</i>	Berichte der deutschen chemischen Gesellschaft.	<i>Jahresber. Fortschr. Chem.</i>	Jahresbericht über die Fortschritte der Chemie.
<i>Ber. deut. pharm. Ges.</i>	Berichte der deutschen pharmazeutischen Gesellschaft.	<i>J. Am. Chem. Soc.</i>	Journal of the American Chemical Society.
<i>Ber. ges. Physiol. exptl. Pharmacol.</i>	Berichte über die gesamte Physiologie und experimentelle Pharmakologie.	<i>J. Am. Pharm. Assocn.</i>	Journal of the American Pharmaceutical Association.
<i>Biochem. J.</i>	Biochemical Journal.	<i>J. Applied Chem., U.S.S.R.</i>	Journal of Applied Chemistry, U.S.S.R.
<i>Biochem. Z.</i>	Biochemische Zeitschrift.	<i>Japan. J. Chem.</i>	Japanese Journal of Chemistry.
<i>Biol. Zentr.</i>	Biologisches Zentralblatt.	<i>J. Bact.</i>	Journal of Bacteriology.
<i>Brit. Chem. Abstracts</i>	British Chemical Abstracts.	<i>J. Biochem. Japan.</i>	Journal of Biochemistry of Japan.
<i>Bull. Chem. Soc. Japan</i>	Bulletin of the Chemical Society of Japan.	<i>J. Biol. Chem.</i>	Journal of Biological Chemistry.
<i>Bull. Imp. Inst.</i>	Bulletin of the Imperial Institute.	<i>J. Chem. Education</i>	Journal of Chemical Education.
<i>Bull. Inst. Phys. Chem. Research (Tokyo).</i>	Bulletin of the Institute of Physical and Chemical Research, Tokyo.	<i>J. Chem. Ind. Japan</i>	Journal of Chemical Industry (Japan). Now J. Soc. Chem. Ind. Japan.
<i>Bull. sci. acad. roy. Belg.</i>	Bulletin de la classe des sciences, académie royale de Belgique.	<i>J. Chem. Physics</i>	Journal of Chemical Physics.
<i>Bull. sci. pharmacol.</i>	Bulletin des sciences pharmacologiques.	<i>J. Chem. Soc.</i>	Journal of the Chemical Society (London).
<i>Bull. soc. chim.</i>	Bulletin de la société chimique de France.	<i>J. Chem. Soc. Abstracts</i>	Abstracts of the Chemical Society (London).
<i>Bull. soc. chim. Belg.</i>	Bulletin de la société chimique de Belgique.	<i>J. Chem. Soc. Japan</i>	Journal of the Chemical Society of Japan.
<i>Bull. soc. chim. biol.</i>	Bulletin de la société de chimie biologique.	<i>J. chim. phys.</i>	Journal de chimie physique.
<i>Can. Chem. Met.</i>	Canadian Chemistry and Metallurgy.	<i>J. Chinese Chem. Soc.</i>	Journal of the Chinese Chemical Society.
<i>Can. J. Research</i>	Canadian Journal of Research.	<i>J. Gen. Chem. U.S.S.R.</i>	Journal of General Chemistry, U.S.S.R.
<i>Chem. Abstracts</i>	Chemical Abstracts (of the American Chemical Society).	<i>J. Indian Chem. Soc.</i>	Journal of the Indian Chemical Society.
<i>Chem. Ind.</i>	Die Chemische Industrie.	<i>J. Indian Inst. Sci.</i>	Journal of the Indian Institute of Science.
<i>Chem. Met. Eng.</i>	Chemical and Metallurgical Engineering.	<i>J. Org. Chem.</i>	Journal of Organic Chemistry.
<i>Chem. News</i>	Chemical News (and Journal of Industrial Science).	<i>J. Pharmacol.</i>	Journal of Pharmacology and Experimental Therapeutics.
<i>Chem.-Tech. Rundschau</i>	Chemische-Technische Rundschau.	<i>J. pharm. Belg.</i>	Journal de pharmacie de Belgique.

<i>J. pharm. chim.</i>	Journal de pharmacie et de chimie.	<i>Proc. Imper. Acad., Tokyo</i>	Proceedings of the Imperial Academy, Tokyo.
<i>J. Pharm. Soc. Japan</i>	Journal of the Pharmaceutical Society (Japan).	<i>Quart. J. Indian Chem. Soc.</i>	Quarterly Journal of the Indian Chemical Society.
<i>J. Phys. Chem.</i>	Journal of Physical Chemistry.	<i>Quart. J. Pharm. Pharmacol.</i>	Quarterly Journal of Pharmacy and Pharmacology.
<i>J. prakt. Chem.</i>	Journal für praktische Chemie.	<i>Rec. trav. chim.</i>	Recueil des travaux chimiques des Pays-Bas.
<i>J. Proc. Roy. Soc. N.S. Wales</i>	Journal and Proceedings of the Royal Society of New South Wales.	<i>Rev. chim. ind.</i>	Revue de chimie industrielle.
<i>J. Russ. Phys.-Chem. Soc.</i>	Journal of the Russian Physical-Chemical Society.	<i>Rev. prod. chim.</i>	Revue des produits chimiques.
<i>J. Soc. Chem. Ind.</i>	Journal of the Society of Chemical Industry.	<i>Sci. Papers Inst. Phys. Chem. Research, Tokyo</i>	Scientific Papers of the Institute of Physical and Chemical Research (Tokyo).
<i>J. Soc. Chem. Ind. Japan</i>	Journal of the Society of Chemical Industry (Japan).	<i>Sci. reps. Natl. Tsinghua Univ.</i>	Science Reports of the National Tsinghua University.
<i>J. Soc. Dyers Colourists</i>	Journal of the Society of Dyers and Colourists.	<i>Sci. reps. Natl. Univ. Peking</i>	Science Reports of the National University of Peking.
<i>Mem. Coll. Sci., Kyoto Imp. Univ. Monatsh.</i>	Memoirs of the College of Science, Kyoto Imperial University. Monatshefte für Chemie und verwandte Teile anderer Wissenschaften.	<i>Sitzb. Akad. Wiss. Wien</i>	Sitzungsberichte Akademie der Wissenschaften in Wien.
<i>Naturwiss.</i>	Naturwissenschaften.	<i>Trans. Faraday Soc.</i>	Transactions of the Faraday Society.
<i>Org. Chem. Ind. U.S.S.R.</i>	Promischlennosti Organitscheskoi Chimii, U.S.S.R.	<i>Trans. Roy. Soc. Canada.</i>	Transactions of the Royal Society of Canada.
<i>Pharm. J.</i>	Pharmaceutical Journal and Pharmacist.	<i>Z. anal. Chem.</i>	Zeitschrift für analytische Chemie.
<i>Pharm. Ztg.</i>	Die deutsche Pharmazeutische Zeitung.	<i>Z. angew. Chem.</i>	Zeitschrift für angewandte Chemie. Now. Angewandte Chemie.
<i>Pharm. Zentralhalle.</i>	Pharmazeutische Zentralhalle.	<i>Z. anorg. allgem. Chem.</i>	Zeitschrift für anorganische und allgemeine Chemie.
<i>Phil. Mag.</i>	Philosophical Magazine and Journal of Science.	<i>Z. Chem.</i>	Zeitschrift für Chemie.
<i>Proc. Acad. Sci., Amsterdam</i>	Proceedings of the Royal Academy of Sciences of Amsterdam.	<i>Z. Elektrochem.</i>	Zeitschrift für Elektrochemie und angewandte physikalische Chemie.
<i>Proc. Chem. Soc.</i>	Proceedings of the Chemical Society (London).	<i>Z. ges Naturwiss.</i>	Zeitschrift für die gesamte Naturwissenschaft.
<i>Proc. Roy. Soc.</i>	Proceedings of the Royal Society (London).	<i>Z. physik. Chem.</i>	Zeitschrift für physikalische Chemie.
		<i>Z. physiol. Chem.</i>	Zeitschrift für physiologische Chemie (Hoppe-Seyler).

LIST OF SUBSTITUENTS

In the following table is given a list of the principal substituent groups as they are used in the dictionary.

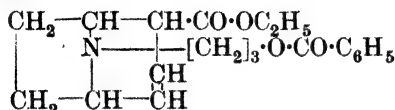
1 —F	Fluoro	17 —SO ₂ H	Sulpho
2 —Cl	Chloro	18 —NH ₂	Amino
3 —Br	Bromo	19 —NH·C ₆ H ₅	Anilino, Phenylimino
4 —I	Iodo	20 —NH·C ₆ H ₄ ·CH ₃	Toluidino
5 —NO	Nitroso	21 —NH·CO·NH ₂	Ureido
6 —NO ₂	Nitro	22 —NH·C(NH) ₂ ·NH ₂	Guanidino
7 —N=N→N	Azido, Triazo	23 —NH·OH	Hydroxylamino
8 —OH	Hydroxy (followed by —OCH ₃ , Methoxy, —OC ₂ H ₅ , Ethoxy, —OCH ₂ ·O— methylenedioxy, —OC ₆ H ₅ , Phenoxy, —O·CO·CH ₃ , Acetoxy, etc. in the order of the group attached to the oxygen)	24 —NH·NH ₂	Hydrazino
9 —SH	Mercapto	25 —NH·NH—	Hydrazo
10 —SO	Thionyl	26 —N·N—	Azo
11 —SO ₂	Sulphonyl	27 ·N≡N ⁺ X ⁻	Diazonium, Diazo (X=OH, Cl, etc.)
12 —SCN	Thiocyano	28 —N=N— (—N=N—) O	Azoxy
13 =O (in C—CO—C)	Keto	29 —As·As—	Arseno
14 >NH	Imino	30 —NH·N·N— (open)	Diazoamino
15 =N·OH	Isanitroso, Oximino	31 —NH·N·N— (cyclic)	Azimino
16 —S—	Thio	32 —CH ₃	Methyl
		33 —CH ₂ OH	Hydroxymethyl, Methylol
		34 —C ₂ H ₅	Ethyl

35	$-\text{CH}_2\text{CH}_2\text{CH}_3$	<i>n</i> -Propyl	99	$-\text{CH}_2\text{[CH}_2\text{]}_6\text{CH}_3$	Heptamethylene
36	$-\text{CH}(\text{CH}_3)_2$	Isopropyl	100	$-\text{CH}_2\text{[CH}_2\text{]}_6\text{CH}_2-$	Octamethylene
37	$-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$	<i>n</i> -Butyl	101	$-\text{CH}_2\text{CH}_2-$	Vinylene
38	$-\text{CH}_2\text{CH}(\text{CH}_3)_2$	Isobutyl	102	$-\text{C}_6\text{H}_5-$	Phenylene
39	$-\text{C}(\text{CH}_3)_3$	<i>tert</i> -Butyl	103	$-\text{C}_6\text{H}_4(\text{CH}_3)-$	Tolylene
40	$-\text{CH}_2\text{[CH}_2\text{]}_3\text{CH}_3$	<i>n</i> -Amyl	104	$-\text{CH}_2-$	Methylene
41	$-\text{CH}(\text{C}_6\text{H}_5)_2$	<i>sec</i> - <i>n</i> -Amyl	105	$=\text{CH}\cdot\text{CH}_2$	Ethylidene
42	$-\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)_2$	Isoamyl	106	$=\text{CH}\cdot\text{CH}_2\cdot\text{CH}_2$	Propylidene
43	$-\text{CH}_2\text{CH}\begin{matrix} \text{CH}_3 \\ \\ \text{C}_2\text{H}_5 \end{matrix}$	active Amyl	107	$=\text{C}(\text{CH}_3)_2$	Isopropylidene
44	$-\text{C}\begin{matrix} \text{CH}_3 \\ / \\ \text{C}_2\text{H}_5 \\ \backslash \\ \text{CH}_3 \end{matrix}$	<i>tert</i> -Amyl	108	$=\text{CH}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2$	Butylidene
45	$-\text{CH}_2\text{[CH}_2\text{]}_5\text{CH}_3$	<i>n</i> -Hexyl	109	$=\text{CH}\cdot\text{CH}(\text{CH}_3)_2$	Isobutylidene
46	$-\text{CH}_2\text{[CH}_2\text{]}_5\text{CH}(\text{CH}_3)_2$	Isohexyl	110	$\text{H}_2\text{C}\begin{matrix} \text{CH}_2\text{CH}_2 \\ \quad \\ \text{CH}_2\text{CH}_2 \end{matrix}\text{C}=\text{C}$	Cyclohexylidene
47	$-\text{CH}_2\text{[CH}_2\text{]}_6\text{CH}_3$	<i>n</i> -Heptyl, Oenanthyl	111	$=\text{C}\cdot\text{CH}_2$	Vinylidene
48	$-\text{CH}_2\text{[CH}_2\text{]}_6\text{CH}(\text{CH}_3)_2$	Isoheptyl	112	$=\text{CH}\cdot\text{CH}\cdot\text{CH}_2$	Allylidene
49	$-\text{CH}_2\text{[CH}_2\text{]}_7\text{CH}_3$	Octyl, Capryl	113	$\text{CH}_2\cdot\text{CH}\cdot\text{CH}\cdot\text{CH}=\text{CH}$	Crotylidene
50	$-\text{CH}_2\text{[CH}_2\text{]}_7\text{CH}_2$	Nonyl	114	$=\text{CH}\cdot\text{C}_6\text{H}_5$	Benzylidene
51	$-\text{CH}_2\text{[CH}_2\text{]}_8\text{CH}_3$	Decyl	115	$=\text{CH}\cdot\text{C}_6\text{H}_4\cdot\text{OH} (-o)$	Salicylidene
52	$-\text{CH}_2\text{[CH}_2\text{]}_8\text{CH}_2$	Undecyl	116	$=\text{CH}\cdot\text{C}_6\text{H}_4\cdot\text{OCH}_3 (-p)$	Anisylidene
53	$-\text{CH}_2\text{[CH}_2\text{]}_{10}\text{CH}_3$	Dodecyl	117	$=\text{CH}\cdot\text{C}_6\text{H}_4\cdot\text{CH}(\text{CH}_3)_2 (-p)$	Cuminyldene
54	$-\text{CH}_2\text{[CH}_2\text{]}_{11}\text{CH}_3$	Tridecyl	118	$=\text{CH}\cdot\text{CH}\cdot\text{CH}\cdot\text{C}_6\text{H}_5$	Cinnamylidene
55	$-\text{CH}_2\text{[CH}_2\text{]}_{12}\text{CH}_3$	Tetradecyl	119	$-\text{CH}_2\cdot\text{CO}\cdot\text{CH}_2$	Acetonyl
56	$-\text{CH}_2\text{[CH}_2\text{]}_{13}\text{CH}_3$	Pentadecyl	120	$-\text{CH}_2\cdot\text{CO}\cdot\text{C}_6\text{H}_5$	Phenacyl
57	$-\text{CH}_2\text{[CH}_2\text{]}_{14}\text{CH}_3$	Cetyl, Hexadecyl	121	$-\text{CH}_2\cdot\text{CO}\cdot\text{C}_6\text{H}_4\cdot\text{CH}_3$	Tolacyl
58	$-\text{CH}_2\text{[CH}_2\text{]}_{15}\text{CH}_3$	Heptadecyl	122	$\text{C}_6\text{H}_5\cdot\text{CH}\cdot\text{CO}\cdot\text{C}_6\text{H}_5$	Desyl
59	$-\text{CH}_2\text{[CH}_2\text{]}_{16}\text{CH}_3$	Octadecyl	123	$-\text{CH}\cdot\text{O}$	Aldehydo, Formyl
60	$-\text{CH}_2\text{[CH}_2\text{]}_{18}\text{CH}_3$	Eicosyl	124	$\equiv\text{CH}$	Methinyl
61	$-\text{CH}_2\text{[CH}_2\text{]}_{24}\text{CH}_3$	Ceryl	125	$-\text{CO}\cdot\text{CH}_2$	Acetyl, Aceto
62	$-\text{CH}_2\text{[CH}_2\text{]}_{28}\text{CH}_3$	Myricyl, Melissyl	126	$-\text{CO}\cdot\text{CH}_2\cdot\text{CH}_2$	Propionyl
63	$-\text{CH}\begin{matrix} \text{CH}_3 \\ \\ \text{CH}_2 \end{matrix}$	Cyclopropyl (followed by Cyclobutyl, Cyclopentyl, Cyclohexyl, Cycloheptyl (Suberyl) in that order)	127	$-\text{CO}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2$	Butyryl
64	$-\text{CH}\cdot\text{CH}_2$	Vinyl	128	$-\text{CO}\cdot\text{CH}(\text{CH}_3)_2$	Isobutyryl
65	$-\text{CH}\cdot\text{CH}\cdot\text{CH}_2$	Propenyl	129	$-\text{CO}\cdot\text{CH}_2\cdot\text{[CH}_2\text{]}_3\cdot\text{CH}_3$	Valeryl
66	$-\text{C}(\text{CH}_3)_2\cdot\text{CH}_2$	Isopropenyl	130	$-\text{CO}\cdot\text{CH}_2\cdot\text{CH}(\text{CH}_3)_2$	Isovaleryl
67	$-\text{CH}_2\cdot\text{CH}\cdot\text{CH}_2$	Allyl	131	$-\text{CO}\cdot\text{CH}_2\cdot\text{[CH}_2\text{]}_3\cdot\text{CH}_3$	Caproyl
68	$-\text{CH}\cdot\text{CH}\cdot\text{CH}\cdot\text{CH}_2$	α -Butenyl	132	$-\text{CO}\cdot\text{CH}_2\cdot\text{[CH}_2\text{]}_{11}\cdot\text{CH}_3$	Palmityl
69	$-\text{CH}_2\cdot\text{CH}\cdot\text{CH}\cdot\text{CH}_2$	β -Butenyl, Crotyl	133	$-\text{CO}\cdot\text{CH}_2\cdot\text{[CH}_2\text{]}_{17}\cdot\text{CH}_3$	Stearyl
70	$-\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}\cdot\text{CH}_2$	γ -Butenyl, Allylomethyl	134	$-\text{CO}\cdot\text{[CH}_2\text{]}_7\cdot\text{CH}\cdot\text{CH}\cdot\text{[CH}_2\text{]}_7\cdot\text{CH}_3$	Oleyl
71	$-\text{CH}_2\cdot\text{[CH}_2\text{]}_7\cdot\text{CH}\cdot\text{CH}\cdot\text{[CH}_2\text{]}_7\cdot\text{CH}_3$	Octadecenyl	135	$-\text{CO}\cdot\text{C}_6\text{H}_5$	Benzoyl
72	$-\text{C}\equiv\text{CH}$	Acetylenyl, Ethinyl	136	$-\text{CO}\cdot\text{C}_6\text{H}_4\cdot\text{OH} (-o)$	Salicyloyl
73	$-\text{CH}_2\cdot\text{C}\equiv\text{CH}$	Propargyl	137	$-\text{CO}\cdot\text{C}_6\text{H}_4\cdot\text{OCH}_3 (-p)$	Anisoyl
74	$-\text{C}_6\text{H}_5$	Phenyl	138	$-\text{CO}\cdot\text{CH}_2\cdot\text{C}_6\text{H}_5$	Phenylacetyl
75	$-\text{C}_6\text{H}_4\cdot\text{CH}_3$	Tolyl	139	$-\text{CO}\cdot\text{C}_6\text{H}_4\cdot\text{CH}_3$	Toluy
76	$-\text{CH}_2\cdot\text{C}_6\text{H}_5$	Benzyl	140	$-\text{CO}\cdot\text{CH}\cdot\text{CH}\cdot\text{C}_6\text{H}_5$	Cinnamoyl
77	$-\text{CH}_2\cdot\text{C}_6\text{H}_4\cdot\text{OH} (-o)$	Salicyl	141	$-\text{CO}\cdot\text{C}_{10}\text{H}_7$	Naphthoyl
78	$-\text{CH}_2\cdot\text{C}_6\text{H}_4\cdot\text{OCH}_3 (-p)$	Anisyl	142	$-\text{CO}\cdot\text{CO}-$	Oxalyl
79	$-\text{CH}_2\cdot\text{CH}_2\cdot\text{C}_6\text{H}_5$	Phenylethyl	143	$-\text{CO}\cdot\text{CH}_2\cdot\text{CO}-$	Malonyl
80	$-\text{CH}_2\cdot\text{C}_6\text{H}_4\cdot\text{CH}_3$	Xylyl	144	$-\text{CO}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CO}-$	Succinyl
81	$-\text{C}_6\text{H}_5\cdot\text{CH}(\text{CH}_3)_2$	Cumyl	145	$-\text{CO}\cdot\text{C}_6\text{H}_4\cdot\text{CO}-$	Phthaloyl, Isophthaloyl, Terephthaloyl
82	$-\text{C}_6\text{H}_5(\text{CH}_3)_3 (1:2:4)$	ψ -Cumyl	146	$-\text{COOH} (-\text{CO}\cdot\text{OCH}_3, -\text{CO}\cdot\text{OC}_2\text{H}_5, \text{etc.})$	Carboxy, (Carbomethoxy, Carboethoxy, etc.)
83	$-\text{C}_6\text{H}_5(\text{CH}_3)_3 (1:3:5)$	Mesityl	147	$-\text{CO}\cdot\text{NH}_2$	Carbamyl
84	$-\text{CH}\cdot\text{CH}\cdot\text{C}_6\text{H}_5$	Styryl	148	$>\text{CO}$	Carbonyl
85	$-\text{CH}_2\cdot\text{CH}\cdot\text{CH}\cdot\text{C}_6\text{H}_5$	Cinnamyl	149	$-\text{C}(\text{NH})\cdot\text{NH}_2$	Guanyl
86	$-\text{C}_{10}\text{H}_7$	Naphthyl	150	$-\text{CN}$	Cyano
87	$-\text{C}_6\text{H}_5\cdot\text{C}_6\text{H}_5$	Diphenyl, Xenyl	151	$-\text{CO}\cdot\text{CH}_2\cdot\text{NH}_2$	Glycyl
88	$-\text{CH}(\text{C}_6\text{H}_5)_2$	Benzhydryl, Diphenylmethyl	152	$-\text{CO}\cdot\text{CH}(\text{NH}_2)_2\cdot\text{CH}_3$	α -Alanyl
89	$-\text{C}_{10}\text{H}_7$	Anthryl, anthranyl	153	$-\text{CO}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{NH}_2$	β -Alanyl
90	$-\text{C}_{12}\text{H}_9$	Phenanthryl	154	$-\text{CO}\cdot\text{CH}(\text{NH}_2)_2\cdot\text{CH}(\text{CH}_3)_2$	Valyl
91	$-\text{C}(\text{C}_6\text{H}_5)_3$	Triphenylmethyl	155	$-\text{CO}\cdot\text{CH}(\text{NH}_2)_2\cdot\text{CH}_2\cdot\text{CH}(\text{CH}_3)_2$	Leucyl
92	$-\text{CH}_2\cdot\text{CH}_2-$	Ethylene, Dimethylene	156	$-\text{CO}\cdot\text{CH}_2\cdot\text{NH}\cdot\text{CO}\cdot\text{C}_6\text{H}_5$	Hippuryl
93	$-\text{CH}(\text{CH}_3)_2\cdot\text{CH}_2-$	Propylene	157	$-\text{C}_4\text{H}_9\text{O}$	Furyl
94	$-\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2-$	Trimethylene	158	$-\text{C}_4\text{H}_9\text{S}$	Thienyl
95	$-\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2-$	Tetramethylene	159	$-\text{CH}_2\cdot\text{C}_6\text{H}_5\text{O}$	Furfuryl
96	$-\text{C}(\text{CH}_3)_2\cdot\text{CH}_2-$	Isobutylene	160	$=\text{CH}\cdot\text{C}_6\text{H}_5\text{O}$	Furfurylidene
97	$-\text{CH}_2\text{[CH}_2\text{]}_3\cdot\text{CH}_2-$	Pentamethylene	161	$-\text{CO}\cdot\text{C}_6\text{H}_5\text{O}$	Furoyl, Pyromucyl
98	$-\text{CH}_2\text{[CH}_2\text{]}_4\cdot\text{CH}_2-$	Hexamethylene	162	$-\text{C}_6\text{H}_5\text{NH}$	Pyrryl
			163	$-\text{C}_6\text{H}_5\text{N}$	Pyridyl

DICTIONARY OF ORGANIC COMPOUNDS

E

Eccaine



$\text{C}_{20}\text{H}_{25}\text{O}_4\text{N}$ MW, 343

Oil. Non-toxic anæsthetic.

B, HCl: cryst. from EtOH-Et₂O. M.p. 117°.

Sol. H₂O.

B, H₂PtCl₆: m.p. 69-70°.

Picrate: m.p. 139-41°.

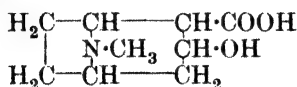
Methiodide: m.p. 194-5°.

v. Braun, Müller, *Ber.*, 1918, 51, 251.

Ecgonidine.

See Anhydroecgonine.

Ecgonine



$\text{C}_9\text{H}_{15}\text{O}_3\text{N}$ MW, 185

l.

Prisms + 1H₂O from EtOH.Aq. M.p. 198° decomp. M.p. anhyd. 205°. Sol. H₂O, EtOH. Insol. Et₂O. $[\alpha]_D -45.4^\circ$. $\text{KMnO}_4 \rightarrow$ nor-*l*-ecgonine.

Me ester: $\text{C}_{10}\text{H}_{17}\text{O}_3\text{N}$. MW, 199. Prisms from EtOH. M.p. 212° decomp. *Methiodide*: m.p. 164°. $[\alpha]_D^{20} -17.6^\circ$.

Amide: $\text{C}_9\text{H}_{16}\text{O}_2\text{N}_2$. MW, 184. Prisms or plates from EtOH. M.p. 198°. Sol. H₂O. Insol. Et₂O, Me₂CO, C₆H₆. *Hydrochloride*: m.p. 275° decomp. *Chloroplatinate*: m.p. 239° decomp. *Picrate*: needles from EtOH.Aq. M.p. 150°. *Methiodide*: m.p. 203°.

B, HCl: plates. M.p. 246°. $[\alpha]_D -57^\circ$.

B₂, H₂PtCl₆: m.p. 226°.

Benzoyl: needles from H₂O. M.p. anhyd. 195°. $[\alpha]_D -63.3^\circ$ in H₂O. *Me ester*: see β-Cocaine. *Et ester*: Homococaine, cocaethyl-ine. Prisms from Et₂O. M.p. 108-9°. Similar to cocaine but less toxic. Not mydriatic.

dl.

Plates + 3H₂O from EtOH.Aq. M.p. 93-118°, anhyd. 203° (212° rapid heat.).

Dict. of Org. Comp.—II.

Me ester: hydrochloride, m.p. 195°. *Methiodide*: m.p. 162°.

B₂, HCl: plates. M.p. 247°.

Chloroaurate: needles. M.p. 205°.

Willstätter, Bode, *Ann.*, 1902, 326, 61, 76.

Willstätter, Wolfes, Mäder, *Ann.*, 1923, 434, 111.

Liebermann, *Ber.*, 1888, 21, 2351.

Liebermann, Giesel, *ibid.*, 3197.

Einhorn, Norwall, *Ber.*, 1893, 26, 963.

ψ-Ecgonine

$\text{C}_9\text{H}_{16}\text{O}_3\text{N}$ MW, 185

d.

Cryst. from EtOH. M.p. 254° (264°).

Me ester: $\text{C}_{10}\text{H}_{17}\text{O}_3\text{N}$. MW, 199. Cryst. from Et₂O. M.p. 115°. $[\alpha]_D^{20} +19.5^\circ$ in H₂O.

B, HCl: $[\alpha]_D^{20} +23.67^\circ$ in H₂O.

B, HCl: prisms. M.p. 236°. $[\alpha]_D +1.6^\circ$.

B, H₂AuCl₄: m.p. 220° decomp.

Methiodide: leaflets from MeOH. M.p. 209°.

l.

Me ester: m.p. 115°.

r.

Cryst. from EtOH. M.p. 251° decomp. Sol. H₂O. Spar. sol. EtOH.

Me ester: prisms. M.p. 125-6°. *Methiodide*: needles from EtOH. M.p. 182-5°.

B, HCl, ½H₂O: needles. M.p. 149°.

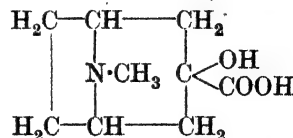
Chloroaurate: needles. M.p. 213° decomp.

Willstätter, Wolfes, Mäder, *Ann.*, 1923, 434, 124.

Einhorn, Marquardt, *Ber.*, 1890, 23, 468.

Willstätter, Bode, *Ber.*, 1901, 34, 1457.

α-Ecgonine



$\text{C}_9\text{H}_{15}\text{O}_3\text{N}$ MW, 185

Cryst. from H₂O. M.p. 305° decomp. Sol. H₂O, EtOH.Aq.

Me ester: $C_{10}H_{17}O_3N$. MW, 199. Prisms from Me_2CO or $AcOEt$. M.p. 114° . Sol. H_2O , $EtOH$, $CHCl_3$. Spar. sol. Et_2O . $B_2H_2PtCl_6 \cdot 2H_2O$: m.p. 204° . B_2HAuCl_4 : orange-yellow leaflets from H_2O . M.p. $95-6^\circ$. *Methiodide*: needles from $MeOH$. M.p. $201-2^\circ$. *Picrate*: m.p. $189-91^\circ$.

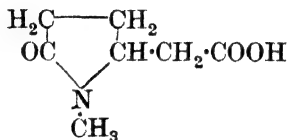
Benzoyl: cryst. from H_2O . M.p. 209° decomp. *Me ester*: see α -Cocaine.

$B_2H_2PtCl_6$: m.p. $223-4^\circ$ decomp.

$B_2HAuCl_4 \cdot H_2O$: m.p. $183-4^\circ$ decomp.

Willstätter, *Ber.*, 1896, **29**, 2216.

Ecgoninic Acid (N-Methyl-2-pyrrolidone-5-acetic acid)



$C_7H_{11}O_3N$

MW, 157

l-.

Prisms from $AcOEt$. M.p. $117-18^\circ$. Sol. $AcOEt$, Me_2CO , $CHCl_3$. Spar. sol. C_6H_6 .

Me ester: $C_8H_{13}O_3N$. MW, 171. B.p. $275^\circ/13.5$ mm.

r-.

Leaflets from $AcOEt-C_6H_6$. M.p. $93-5^\circ$. More soluble than *l*-form.

Ag salt: needles from H_2O . M.p. 240° decomp.

Willstätter, Bode, *Ber.*, 1901, **34**, 519.

Willstätter, Hollander, *ibid.*, 1818.

Echicerin

$C_{30}H_{48}O_2$

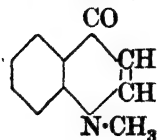
MW, 440

Constituent of *Echites scholaris*, Linn. Needles from $EtOH$. M.p. 157° . Sol. $EtOH$, Et_2O , $CHCl_3$, C_6H_6 . $[\alpha]_D^{25} +63.75^\circ$. Na in pet. ether \rightarrow amorphous acid, $C_{30}H_{46}O_4$. Sol. conc. H_2SO_4 to yellow sol.

Bromide: needles from $EtOH$. M.p. 116° .

Jobst, Hesse, *Ann.*, 1875, **178**, 58.

Echinopsine (N-Methyl- γ -quinolone)



$C_{10}H_9ON$

MW, 159

Alkaloid from seeds of *Echinops Ritro*.

α -.

Cryst. from $EtOH$. M.p. 152° . Sol. H_2O , $EtOH$, $CHCl_3$. Spar. sol. Et_2O .

B, HCl : m.p. $185-6^\circ$.

B, H_2PtCl_6 : m.p. $210-12^\circ$.

Picrate: m.p. $223-4^\circ$.

β -.

Cryst. from $EtOH$. M.p. 135° .

Greshoff, *Rec. trav. chim.*, 1900, **19**, 360.

Späth, Kolbe, *Monatsh.*, 1923, **43**, 469.

Echitamidine

$C_{20}H_{26}O_3N_2$

MW, 342

Constituent of bark of *Alstonia congestis*. Plates from Et_2O . M.p. 244° decomp. (B, H_2O : m.p. 135° .) Sol. H_2O , $EtOH$. $[\alpha]_D^{25} -515^\circ$ in $EtOH$. Conc. $HNO_3 \rightarrow$ blue col. \rightarrow yellow col.

B, HCl : m.p. 179° decomp.

B, HBr : m.p. 181° decomp.

$B_2H_2SO_4$: m.p. 169° decomp.

Picrate: m.p. 226.7° decomp.

Goodson, *J. Chem. Soc.*, 1932, 2628.

Echitamine (Ditaine)

$C_{22}H_{28}O_4N_2$

MW, 384

Principal constituent of bark of *Alstonia congestis*. Prisms $+4H_2O$ from $EtOH$. Loses $3H_2O$ at 105° . B, H_2O , m.p. 206° . Sol. H_2O , $EtOH$, Et_2O . Insol. pet. ether. $[\alpha]_D^{25} -28.8^\circ$ in $EtOH$. Conc. $H_2SO_4 \rightarrow$ purple-red col.

B, HCl : m.p. 295° . *Acetate*:

$C_{22}H_{26}O_4N_2(O \cdot COCH_3)_2 \cdot HCl$.

M.p. 271° .

B, HBr : m.p. 183° .

Goodson, Henry, *J. Chem. Soc.*, 1925, 127, 1640.

Hesse, *Ann.*, 1880, **203**, 144.

Harnack, *Ber.*, 1880, **13**, 1648.

Eicosane (Didecyl)

$CH_3 \cdot CH_2 \cdot [CH_2]_{16} \cdot CH_2 \cdot CH_3$

$C_{20}H_{42}$

MW, 282

Leaflets from $EtOH$. M.p. $36-7^\circ$. B.p. $205^\circ/15$ mm. $D_{20}^{25} 0.7779$.

Krafft, *Ber.*, 1886, **19**, 2220.

Carothers, Hill, Kirby, Jacobson, *J. Am. Chem. Soc.*, 1930, **52**, 5280.

n-Eicosanic Acid (*Arachidic acid*, n-nona-decane-1-carboxylic acid, eicosic acid, eicosanoic acid)

$CH_3 \cdot CH_2 \cdot [CH_2]_{16} \cdot CH_2 \cdot COOH$

$C_{20}H_{40}O_2$

MW, 312

Constituent of *Cascara sagrada*, and of *arachis* (earth-nut, pea-nut) oil as glyceride. Plates from $EtOH$. M.p. 77° (75°). B.p. $203-$

5°/1 mm. Sol. Et₂O, CHCl₃, hot EtOH. D¹⁰⁰ 0.8240. n_D^{100} 1.425.

Me ester: C₂₁H₄₂O₂. MW, 326. M.p. 54.5° (46–7°).

Et ester: C₂₂H₄₄O₂. MW, 340. M.p. 50° (42°). B.p. 295–7°/100 mm.

Phenyl ester: C₂₆H₄₄O₂. MW, 388. M.p. 58.5°.

Anhydride: C₄₀H₇₈O₃. MW, 606. M.p. 77.5°.

Amide: C₂₀H₄₁ON. MW, 311. M.p. 108–9°.

Nitrile: C₂₀H₃₉N. MW, 293. M.p. 49.5°.

Bleyburg, Ulrich, *Ber.*, 1931, **64**, 2512.

Adam, Dyer, *J. Chem. Soc.*, 1925, **127**, 72.

Eicosanoic Acid.

See Eicosanoic Acid.

Eicosanol.

See Eicosyl Alcohol.

Eicosanone-3.

See Ethyl *n*-heptadecyl Ketone.

Eicosanone-7.

See *n*-Hexyl *n*-tridecyl Ketone.

Eicosenic Acid



C₂₀H₃₈O₂ MW, 310

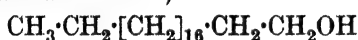
Cryst. from EtOH. M.p. 50°. B.p. 267°/15 mm.

Bodenstein, *Ber.*, 1894, **27**, 3403.

Eicosoic Acid.

See Eicosanoic Acid.

Eicosyl Alcohol (1-Hydroxyeicosane, *eicosanol*, *arachidic alcohol*)



C₂₀H₄₂O MW, 298

Wax. M.p. 65.5° (71°). B.p. 220°/3 mm. Sol. hot pet. ether, hot C₆H₆. Ox. → *arachidic acid*.

Acetyl: m.p. 40°.

Adam, Dyer, *J. Chem. Soc.*, 1925, **127**, 71.

Levene, Taylor, *J. Biol. Chem.*, 1924, **59**, 905.

Haller, *Compt. rend.*, 1907, **144**, 597.

Eicosyl iodide (1-Iodoeicosane)



C₂₀H₄₁I MW, 409

Cryst. from Me₂CO. M.p. 42–3°. Zn + HCl → *eicosane*.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 526.

Levene, Taylor, *J. Biol. Chem.*, 1924, **59**, 916.

Eicosylmalonic Acid.

See Heneicosane-1 : 1-dicarboxylic Acid.

Eikonogen.

See 1-Amino-2-naphthol-6-sulphonic Acid.

Elæomargaric Acid.

See Elæostearic Acid.

Elæostearic Acid (Elæomargaric Acid)



C₁₈H₃₆O₂ MW, 278

α- or *cis*:

Leaflets from EtOH. M.p. 47°. Sol. EtOH, Et₂O, CS₂. n_D^{15} 1.5043. S or I → β-form. Adds Br₂ → β-tetrabromide. Esters rearrange to β-esters.

β- or *trans*:

Leaflets from EtOH. M.p. 67° (72°). Sol. hot EtOH, H₂O. Insol. Et₂O.

Me ester: C₁₉H₃₂O₂. MW, 292. B.p. 209–224°/10 mm. D¹² 0.900. n_D^{12} 1.482.

Et ester: C₂₀H₃₄O₂. MW, 306. B.p. 232°/14 mm. n_D^{20} 1.502.

Bromide: m.p. 115°.

Böeseken, Hoogland, Smit, Broek, *Rec. trav. chim.*, 1927, **46**, 619.

Böeseken, Ravenswaay, *Rec. trav. chim.*, 1925, **44**, 241.

Kametaka, *J. Chem. Soc.*, 1903, **83**, 1045.

Elaidic Acid (Trans isomer of oleic acid)



C₁₈H₃₄O₂ MW, 282

Plates from EtOH. M.p. 44–5°. Sol. EtOH, Et₂O. B.p. 234°/15 mm. D²⁰ 0.8505. n_D^{20} 1.4308. SO₂ or S → *oleic acid*. HI + P → *stearic acid*.

Me ester: C₁₉H₃₆O₂. MW, 296. B.p. 213–15°/15 mm. D²⁵ 0.8702. n_D^{25} 1.446.

Et ester: C₂₀H₃₈O₂. MW, 310. B.p. 217–19°/15 mm. D²⁵ 0.8664. n_D^{25} 1.445.

Chloride: C₁₈H₃₃OCl. MW, 300.5. B.p. 216°/13 mm.

Anhydride: C₃₆H₆₆O₃. MW, 546. M.p. 51°.

Amide: C₁₈H₃₅ON. MW, 281. M.p. 93–4°.

Nitrile: C₁₈H₃₃N. MW, 263. M.p. –1°. B.p. 213°/16 mm.

Dibromide: m.p. 29–30°.

Nitroschloride: m.p. 99–100°.

Harries, Thieme, *Ann.*, 1905, **343**, 354.

Rankoff, *Ber.*, 1931, **64**, 619.

Phillipi, *Monatsh.*, 1929, **51**, 277 (*Bibl.*).

Elaidic Alcohol.

See Octadecenyl Alcohol.

Elaidyl Alcohol.

See Octadecenyl Alcohol.

α -Elaterin.

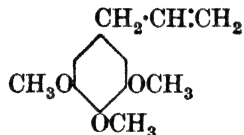
Constituent of fruit of *Ecballium elaterium*. Prisms from EtOH. M.p. 223° (230°). Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Insol. H₂O. $[\alpha]_D^{25}$ -52.9°. Dark red sol. in conc. H₂SO₄. Physiologically inactive.

Power, Moore, *Pharm. J.*, 1919, [4], 29, 501; *J. Chem. Soc.*, 1909, 95, 1989.

 β -Elaterin.

Constituent of fruit of *Ecballium elaterium*. Needles from EtOH. M.p. 190-5°. $[\alpha]_D^{25}$ +13.9°. More sol. EtOH than α -elaterin. Physiologically active.

See above references.

Elemicin (3 : 4 : 5-Trimethoxy-1-allylbenzene)

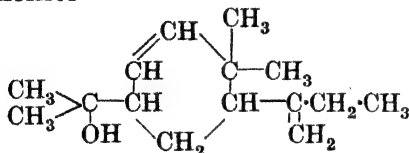
C₁₂H₁₆O₃ MW, 208

Constituent of Elemi oil. B.p. 144-7°/10 mm. D₂₀ 1.063. n_D^{20} 1.5288. Ozone \rightarrow trimethoxyphenylacetic acid. NaOH \rightarrow isoelemicin (3 : 4 : 5-trimethoxy-1-propenylbenzene), b.p. 153-6°/10 mm., D₂₀ 1.077, n_D^{20} 1.547.

Semmler, *Ber.*, 1908, 41, 1918, 2556.

Mauthner, *Ann.*, 1917, 414, 252.

Smith, *Proceedings of the Royal Society of Victoria*, 1919, 32, 14.

 α -Elemol

C₁₅H₂₆O MW, 222

Constituent of Manila elemi oil. M.p. 47°. B.p. 142-3°/12 mm. D₄¹⁸ 0.9345. n_D^{18} 1.4980. Warm H-COOH \rightarrow elemene. Sc \rightarrow endalene. Benzoyl : b.p. 160-4°/0.25 mm.

Phenylurethane : m.p. 112°.

Dihydro deriv. : m.p. 47°. B.p. 138°/12 mm. D₄¹⁸ 0.934. n_D^{18} 1.4925.

Ruzicka, Pfeiffer, *Helv. Chim. Acta*, 1926, 9, 841.

Ruzicka, van Veen, *Ann.*, 1929, 476, 70.

 α -Elemolic Acid (α -Elemic acid)

C₃₀H₄₈O₃ MW, 456

Cryst. from Me₂CO.Aq. M.p. 215°. $[\alpha]_D$ -24.48°. Ox. \rightarrow elemonic acids.

Me ester : C₃₁H₅₀O₃. MW, 470. M.p. 144-5°. B.p. 252-3°/0.2 mm.

Et ester : C₃₂H₅₂O₃. MW, 484. M.p. 132-5-133.5°. B.p. 263-5°/0.3 mm. D₄¹⁸ 0.9685. n_D^{18} 1.4836.

Acetate : m.p. 225°. $[\alpha]_D^{20}$ -40°.

Dibromide : m.p. 207°. $[\alpha]_D^{20}$ -17.14°.

Dihydro deriv. : m.p. 238° (246-7°).

Ruzicka et al., *Helv. Chim. Acta*, 1932, 15, 681.

Mladenovic, Lieb, *Monatsh.*, 1931, 58, 69.

 γ -Elemolic Acid

C₃₀H₅₀O₃ MW, 458

Cryst. from EtOH. M.p. 281°. $[\alpha]_D^{20}$ +68.76°.

Acetate : m.p. 180°.

See above references.

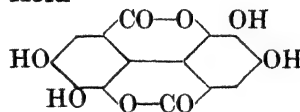
 δ -Elemolic Acid

C₃₀H₄₆O₃ MW, 454

M.p. 217-19°.

Me ester : C₃₁H₄₈O₃. MW, 468. M.p. 112-13°. D₁₈¹⁸ 0.9958. n_D^{18} 1.4949.

Ruzicka et al., *Helv. Chim. Acta*, 1932, 15, 681.

Ellagic Acid

C₁₄H₆O₈ MW, 302

Occurs free and combined in galls. Needles + 2Py from Py. M.p. above 360°. Spar. sol. H₂O, EtOH. Insol. Et₂O. Sol. alkalis \rightarrow yellow sols. FeCl₃ \rightarrow green col. KOH fusion \rightarrow hexahydroxydiphenyl. Zn dist. \rightarrow fluorene.

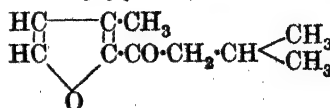
Tetra-acetyl : m.p. 343-6° (317-19°).

Tetracarbethoxyl : m.p. 244°.

Perkin, Nierenstein, *J. Chem. Soc.*, 1905, 87, 1415.

Nierenstein, *Helv. Chim. Acta*, 1931, 14, 912.

Zetzsche, Graef, *ibid.*, 240.

Elsholtzione (Isobutyl 3-methylfuryl ketone, 3-methyl-2-isobutyrylfuran)

C₁₀H₁₄O₂ MW, 166

Constituent of *Elsholtzia cristata*. B.p. 210°, 91–4°/12 mm. D_{20}^{20} 0.9817. n_D^{20} 1.4842.

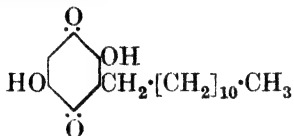
Oxime: m.p. 54°.

Semicarbazone: m.p. 171–2°.

Reichstein, Zschokke, Goerg, *Helv. Chim. Acta*, 1931, 14, 1277.

Asahina, Murayama, *Arch. Pharm.*, 1914, 252, 435.

Embelin (*Embelic acid*, 2:5-dihydroxy-3-n-dodecyl-p-benzoquinone)



$C_{18}H_{28}O_4$

MW, 308

Constituent of *Embelia ribes*. Orange red plates from $Et_2O-C_6H_6$. M.p. 143° (with sublimation). Insol. H_2O . Reddish-violet sols. in alkalis. Gives coloured pptes. with many inorganic salts. Combines with primary amines. $KOH.Aq. \rightarrow$ 1-ketomyristic acid. Tautomerises. Anthelmintic.

Diacetyl: m.p. 54°.

Dibenzoyl: m.p. 97–8°.

Tetra-oxime: m.p. 175°.

Di-semicarbazone: m.p. 236°.

Di-phenylhydrazone: m.p. 189–90°.

Benzylidene deriv.: m.p. 112°.

Di-benzylidene deriv.: m.p. 142°.

Di-methylamine deriv.: m.p. 216°.

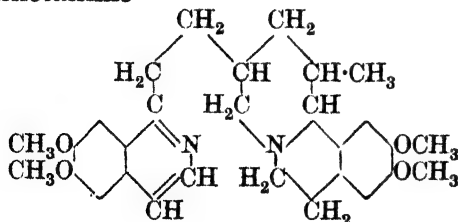
Di-aniline deriv.: m.p. 167–8°.

Heffer, Feuerstein, *Arch. Pharm.*, 1900, 238, 15.

Hasan, Stedman, *J. Chem. Soc.*, 1931, 2112.

Kaul, Ray, Dutt, *J. Indian Chem. Soc.*, 1929, 6, 577.

Emetamine



$C_{29}H_{36}O_4N_2$

MW, 476

From roots of *Psychotria ipecacuanha*. Needles from $AcOEt$. M.p. 153–4°. Sol. $EtOH$, C_6H_6 , $CHCl_3$. Spar. sol. Et_2O . Insol. H_2O , alkalis. Sol. conc. H_2SO_4 . $[\alpha]_D^{20} +13.6$.

$B,2HCl$: m.p. anhyd. 218–23°. $[\alpha]_D -17.5^\circ$.

$B,2HBr$: m.p. 210–25°. $[\alpha]_D -24.3^\circ$.

$B,2HNO_3$: m.p. 165–6°.

$B,2H_2C_2O_4$: m.p. 172°. $[\alpha]_D -6^\circ$.

Picrate: m.p. 173°.

Brindley, Pyman, *J. Chem. Soc.*, 1927, 1071.

Emetine (*Cephæline methyl ether*. See formula under Cephæline)

$C_{29}H_{40}O_4N_2$

MW, 480

Principal alkaloid from roots of *Psychotria ipecacuanha*. Amorphous powder. M.p. 74°. Sol. $EtOH$, Et_2O , $CHCl_3$. Spar. sol. C_6H_6 . Insol. H_2O . $[\alpha]_D^{15} -32.7^\circ$. Sensitive to light.

$B,2HCl$: m.p. 235–55°. $[\alpha]_D +21^\circ$.

$B,2HBr$: m.p. 250–65°. $[\alpha]_D +15.2^\circ$.

$B,2HNO_3$: m.p. 245°.

B,H_2SO_4 : m.p. 205–45°.

Staüb, *Helv. Chim. Acta*, 1927, 10, 826.

Carr, Pyman, *J. Chem. Soc.*, 1914, 105, 1591.

Späth, Lieche, *Ber.*, 1927, 60, 688.

Emodin.

See Aloe-emodin, Frangula-emodin, and Natal-emodin.

Enneamethylene.

See Cyclononane.

Ephedrine (2-Methylamino-1-phenylpropa-nol-1, α -hydroxy- β -methylaminopropylbenzene)

$C_6H_5 \cdot CH(OH) \cdot CH(NH \cdot CH_3) \cdot CH_3$

$C_{10}H_{15}ON$

MW, 165

l-. Present in various species of *Ephedra*.

Hydrated cryst. from H_2O . M.p. 40°. B.p. 225°. Sol. H_2O , $EtOH$, Et_2O , $CHCl_3$. $[\alpha]_D^{20} -6.3^\circ$ in $EtOH$.

B,HCl : m.p. 218°. $[\alpha]_D^{20} -36.6^\circ$ (-34.9°) in H_2O .

B,HBr : m.p. 205°.

B,H_2PtCl_6 : needles. M.p. 186°.

$B,HAuCl_4$: yellow needles. M.p. 128–31°.

N-p-Nitrobenzoyl: pale yellow prisms. M.p. 187–8°. $[\alpha]_D^{20} -51.77^\circ$ in $CHCl_3$.

d-. Plates from H_2O . M.p. 40–40.5°.

B,HCl : plates from $EtOH$. M.p. 217–18°. $[\alpha]_D^{20} +34.42^\circ$ in H_2O . More easily sol. than *l*-form.

N-p-Nitrobenzoyl: yellowish leaflets from $EtOH$. M.p. 187–8°. $[\alpha]_D^{20} +51.12^\circ$ in $CHCl_3$.

dl-. Needles from Et_2O or pet. ether. M.p. 76°.

Sol. H_2O , $EtOH$, Et_2O , $CHCl_3$, C_6H_6 .

B, HCl: plates from EtOH. M.p. 188–189.5°.

B, HAuCl₄: yellow cryst. M.p. 115°.

B₂, H₂PtCl₆: reddish-yellow needles or leaflets. M.p. 199° (183°) decomp.

N-p-Nitrobenzoyl: pale yellow plates from EtOH. M.p. 162°.

Methiodide: needles. M.p. 228–9°.

Nagai, Kanao, *Ann.*, 1929, **470**, 157.

Emde, *Helv. Chim. Acta*, 1929, **12**, 365, 405.

Späth, Göhring, *Monatsh.*, 1920, **41**, 319.

Freudenburg, Braun, Schoeffel, *J. Am. Chem. Soc.*, 1932, **54**, 234.

Hoffmann-La Roche A.G., D.R.P.,

554,553, (*Chem. Zentr.*, 1932, II, 1693).

ψ-Ephedrine (*Isoephedrine*)



$\text{C}_{10}\text{H}_{15}\text{ON}$ MW, 165

l.

Prisms from Et₂O. M.p. 118–118.5°. $[\alpha]_D^{20} -51.93^\circ$ in EtOH.

B, HCl: needles from EtOH. M.p. 182–182.5°. $[\alpha]_D^{20} -61.88^\circ$.

d.

Occurs in leaves of *Ephedra vulgaris*. Prisms from Et₂O. M.p. 117–18°. $[\alpha]_D^{20} +51.24^\circ$ in EtOH. Sol. EtOH, Et₂O. Spar. sol. cold H₂O.

B, HCl: prisms from EtOH. M.p. 182–182.5°. $[\alpha]_D^{20} +61.6^\circ$ in H₂O.

Oxalate: needles from EtOH. M.p. 219°.

N-p-Nitrobenzoyl: yellowish cryst. from EtOH. M.p. 177°. $[\alpha]_D^{20} +140.8^\circ$ in CHCl₃.

B, HAuCl₄: m.p. 126–126.5°.

dl.

Needles. M.p. 118°. Sol. EtOH, C₆H₆. Spar. sol. H₂O, Et₂O.

B, HCl: needles from EtOH. M.p. 164°.

Oxalate: prisms from EtOH. M.p. 218° decomp.

B, HAuCl₄: yellow prisms. M.p. 117°.

(*B, HCl*)₂, *AuCl₃*: yellow needles. M.p. 194°.

N-p-Nitrobenzoyl: prisms from EtOH. M.p. 165–6°.

Methiodide: cryst. from H₂O. M.p. 183°.

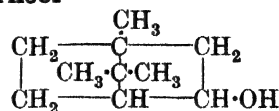
Späth, Koller, *Ber.*, 1925, **58**, 1268.

Nagai, Kanao, *Ann.*, 1929, **470**, 157.

Emde, *Helv. Chim. Acta*, 1929, **12**, 365.

Bossert, Brode, *J. Am. Chem. Soc.*, 1934, **56**, 165.

l-Epiborneol



$\text{C}_{10}\text{H}_{18}\text{O}$

MW, 154

Cryst. from pet. ether. M.p. 181–182.5°. Ox. → *l*-epicamphor.

Acetyl: b.p. 114°/19 mm., $[\alpha]_D^{18} +15.63^\circ$. $D_4^{18} 0.988$.

Phenylurethane: needles from pet. ether. M.p. 82°.

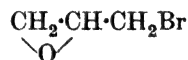
Dinitrobenzoate: m.p. 103°. $[\alpha]_D^{18} +28.37$.

Bredt, Pinten, *J. prakt. Chem.*, 1927, **115**, 52.

Bredt, Perkin, *J. Chem. Soc.*, 1913, **103**, 2222.

Bredt-Savelsberg, Bund, *J. prakt. Chem.*, 1931, **131**, 48.

α-Epibromohydrin (3-Bromopropylene oxide)



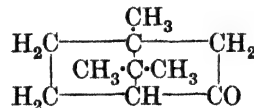
$\text{C}_3\text{H}_5\text{OBr}$

MW, 137

B.p. 134–6°, 61–2°/50 mm.

Braun, *J. Am. Chem. Soc.*, 1932, **54**, 1250.

Epicamphor (β-Camphor)



$\text{C}_{10}\text{H}_{16}\text{O}$

MW, 152

l.

M.p. 183.5–184° (corr.). B.p. 213°. $[\alpha]_D^{18} -58.21^\circ$ in C₆H₆. Very sol. EtOH, Et₂O. Spar. sol. H₂O. Na + EtOH → *l*-epiborneol. Ox. → *d*-camphoric acid. Odour similar to that of *d*-camphor.

Oxime: needles from MeOH. M.p. 103–4°. $[\alpha]_D +100.5^\circ$.

Semicarbazone: needles from EtOH. M.p. 237–8° decomp.

Isonitroso deriv.: exists in two forms. M.p.'s 168–70° and 138–40°.

d.

M.p. 182°. $[\alpha]_D +58.4^\circ$ in C₆H₆.

Oxime: needles from MeOH. M.p. 103°. $[\alpha]_D -98.9^\circ$.

Semicarbazone: needles. M.p. 237–8°.

dl.

Cryst. from pet. ether. M.p. 180°.

Oxime: needles from MeOH. M.p. 98–100°.

Bredt, Perkin, *J. Chem. Soc.*, 1913, **103**, 2182.

Furness, Perkin, *J. Chem. Soc.*, 1914, **105**, 2026.

Bredt, Bredt-Savelsberg, *Ber.*, 1929, **62**, 2216.

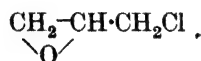
Bredt, Drouven, Schumann, Scholl, *J. prakt. Chem.*, 1931, **131**, 132.

Asahina, Ishidate, Momose, *Ber.*, 1934, **67**, 1432.

Epicatechin.

See under Catechin.

α -Epichlorohydrin (3-Chloropropylene oxide)



$\text{C}_3\text{H}_5\text{OCl}$

MW, 92.5

B.p. 115–17°, 60–61°/100 mm. D_4^{20} 1.181. n_D^{20} 1.438. Insol. H_2O . Hot AcOH \rightarrow acetochlorohydrin. $\text{Ac}_2\text{O} \rightarrow$ diacetochlorohydrin. Na or Na.Hg \rightarrow allyl alcohol. HI \rightarrow *n*-propyl chloride. $\text{EtOH} + \text{H}_2\text{SO}_4 \rightarrow$ 1-chlorohydrin 3-Et ether.

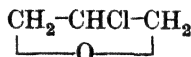
Polyepichlorohydrin: needles from EtOH. M.p. 109–10°.

Clarke, Hartman, *Organic Syntheses*, Collective Vol. I, 228.

Fairbourne, Gibson, Stephens, *J. Chem. Soc.*, 1932, 1968.

Braun, *J. Am. Chem. Soc.*, 1932, **54**, 1248.

β -Epichlorohydrin (2-Chlorotrimethylene oxide)



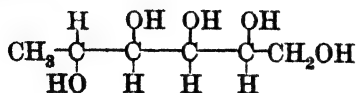
$\text{C}_3\text{H}_5\text{OCl}$

MW, 92.5

B.p. 132–4°. More stable than the α -compound. Does not react with very dil. acids. $\text{PCl}_5 \rightarrow \text{CH}_2\text{---CCl---CH}_2\text{Cl}$. Na or Na.Hg \rightarrow allyl alcohol.

Bigot, *Ann. chim. phys.*, 1891, **22**, 468.

Epifucitol



$\text{C}_6\text{H}_{14}\text{O}_5$

MW, 166

d-.

Cryst. from H_2O . M.p. 104°. $[\alpha]_D^{21} +2^\circ$ in H_2O .

Di-benzylidene deriv.: needles from EtOH. M.p. 184°.

l-.

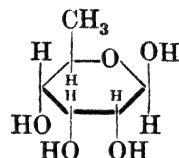
Cryst. from H_2O . M.p. 104°. $[\alpha]_D -2.3^\circ$ in H_2O .

Di-benzylidene deriv.: cryst. from EtOH. M.p. 183°. $[\alpha]_D +39.7^\circ$ in CHCl_3 .

Votoček, Valentin, *Chem. Zentr.*, 1930, **I**, 2544.

Votoček, Kučerenko, *ibid.*

Epifucose



Probable structure

$\text{C}_6\text{H}_{12}\text{O}_5$

MW, 164

d- (Epirhodoose).

Dextrorotatory syrup. $\text{HNO}_3 \rightarrow$ trihydroxyriboglutaric acid. NaHg (acid) \rightarrow epi-*d*-fucitol. Epimeric with *d*-fucose (rhodoose).

Phenylosazone: m.p. 170°. Decomp. at 177–80°.

Methylphenylhydrazone: m.p. 136°.

l-.

Yellow laevorotatory syrup. 12% HCl \rightarrow methylfurfural. NaHg (acid) \rightarrow epi-*l*-fucitol. Gives deep red col. with 1-naphthol in EtOH + conc. H_2SO_4 . Epimeric with *l*-fucose.

Phenylosazone: m.p. 177–8° decomp.

p-Bromophenylosazone: m.p. 204°.

Methylphenylhydrazone: m.p. 137°.

Votoček, Krauz, *Ber.*, 1911, **44**, 362.

Votoček, Valentin, *Chem. Zentr.*, 1930, **I**, 2544.

Votoček, Červený, *Ber.*, 1915, **48**, 658; *Chem. Zentr.*, 1928, **I**, 267.

Votoček, Kučerenko, *Chem. Zentr.*, 1930, **I**, 2544.

Epiglucosamine.

See under Glucosamine.

Epiglucosaminic Acid.

See under Glucosaminic Acid.

Epihydrin Alcohol.

See Glycide.

Epinephrine.

See *l*-Adrenaline.

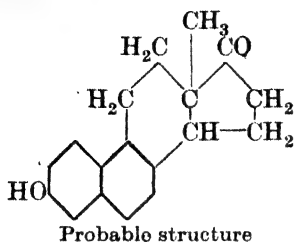
Epirhodoose.

See Epifucose.

ε-Acid (*Epsilon acid*).

See 1-Naphthol-3 : 8-disulphonic Acid.

Equilenine



$C_{18}H_{18}O_2$

MW, 266

Occurs in urine of pregnant mares. Needles from MeOH. M.p. 258–9° decomp. Spar. sol. EtOH. $[\alpha]_D^{25} + 87^\circ$.

Acetyl: m.p. 156–7°.

Benzoyl: needles from EtOH. M.p. 222–3°.

Monobromide: needles from propyl alcohol. M.p. 225–7° decomp.

Oxime: needles from EtOH. M.p. 249–50°.

Semicarbazone: needles. M.p. 268°.

Picrate: orange prisms. M.p. 205–8°.

Girard *et al.*, *Compt. rend.*, 1932, 195, 981; *Bull. soc. chim. biol.*, 1933, 15, 562.

Sandulesco, Tehung, Girard, *Compt. rend.*, 1933, 196, 137.

Equiline

$C_{18}H_{20}O_2$ (?)

MW, 268

M.p. 238–40°. Sublimes in vacuo at 170–200°. $[\alpha]_D^{25} + 308^\circ$ in dioxan (1% sol.).

Semicarbazone: needles from Py. M.p. 265–7°.

Oxime: needles from EtOH.Aq. M.p. 221–3°.

Benzoyl: plates from EtOH. M.p. 197–8°.

Girard *et al.*, *Compt. rend.*, 1932, 194, 1020.

Equol

$C_{15}H_{14}O_3$

MW, 242

Inactive phenol isolated from mare's urine. Cryst. from EtOH.Aq. M.p. 189–190.5°. $[\alpha]_{5461} - 21.5^\circ$.

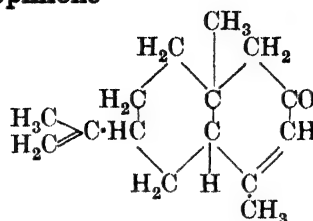
Di-Me ether: $C_{17}H_{18}O_3$. MW, 270. Cryst. from MeOH. M.p. 89°.

Diacetyl: cryst. from MeOH. M.p. 122.5°.

Dibenzoyl: cryst. from MeOH-CHCl₃. M.p. 187–9°. Forms liquid crystals.

Marrian, Haslewood, *Biochem. J.*, 1932, 26, 1227.

Eremophilone



$C_{15}H_{22}O$

MW, 218

Constituent of oil from wood of *Eremophila Mitchellii*. Needles from MeOH. M.p. 41–2°. B.p. 171°/15 mm. D_{25}^{20} 0.9994. n_D^{25} 1.5182. $[\alpha]_{5461}^{25} - 207^\circ$ in MeOH. Does not reduce Fehling's nor give col. with FeCl₃. $H_2O_2 \rightarrow$ eremophilone oxide, m.p. 63–4°. $Na + EtOH \rightarrow$ dihydroeremophilol, b.p. 168–70°/14 mm.

Semicarbazone: m.p. 202–3°. $[\alpha]_{5461}^{25} - 293^\circ$ in MeOH.

Hydroxymethylene deriv.: prisms from MeOH. M.p. 105°.

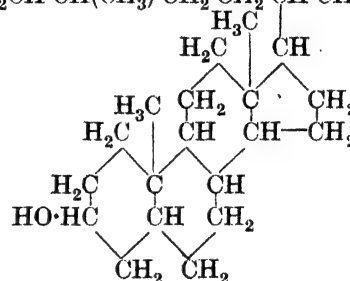
Bradfield, Penfold, Simonsen, *J. Chem. Soc.*, 1932, 2744.

Ergamine (Histamine).

4-[ω-Aminoethyl]-glyoxaline, *q.v.*

Ergostanol (Hexahydroergosterol)

$(CH_3)_2CH \cdot CH(CH_3) \cdot CH_2 \cdot CH_2 \cdot CH \cdot CH_3$



$C_{28}H_{50}O$

MW, 402

Needles from MeOH-Et₂O. M.p. 144–5°. $[\alpha]_D + 15.94^\circ$ in CHCl₃.

Acetyl: needles from MeOH-Et₂O. M.p. 144–5°. $[\alpha]_D + 5.95^\circ$ in CHCl₃.

Chloroacetyl: m.p. 200–1°.

Benzoyl: m.p. 163–5°.

p-Toluenesulphonyl: m.p. 150–1°.

Reindel, *Ann.*, 1928, 466, 141.

Heilbron, Sexton, *J. Chem. Soc.*, 1929, 921.

Ergosterol (Tetrahydroergosterol)

$C_{28}H_{48}O$

MW, 400

α-

Leaves from MeOH. M.p. 130–1°. $[\alpha]_D + 17.86^\circ$ in CHCl₃.

Acetyl: leaves from EtOH. M.p. 110°. $[\alpha]_D^{20} +5.18^\circ$ in CHCl_3 .

Benzoyl: needles from MeOH-Et₂O. M.p. 118°.

p-Toluenesulphonyl: m.p. 162-3° decomp.

β -.

Plates from EtOH. M.p. 141-2°. $[\alpha]_D^{20} +19.4^\circ$ in CHCl_3 .

Acetyl: plates from EtOH. M.p. 111-12°. $[\alpha]_D^{20} +13.1^\circ$ in CHCl_3 .

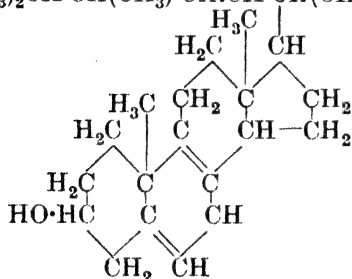
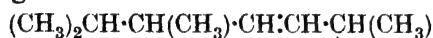
Benzoyl: prisms from C₆H₆-EtOH. M.p. 158-60°. $[\alpha]_D^{20} +18.3^\circ$.

Roindel, Walter, *Ann.*, 1928, **460**, 212.

Heilbron, Wilkinson, *J. Chem. Soc.*, 1932, 1708.

See also last reference above.

Ergosterol



Suggested formula

C₂₈H₄₄O

MW, 396

Occurs in yeast. Cryst. with H₂O of cryst. from EtOH, anhyd. from Et₂O. M.p. 163°. $[\alpha]_D -133^\circ$ in CHCl_3 . Sol. CHCl_3 , C₆H₆. Spar. sol. EtOH, Et₂O, AcOH, pet. ether. Ultra-violet irradiation \rightarrow mixture of compounds including Vitamin D. SbCl₃ in $\text{CHCl}_3 \rightarrow$ violet col. Forms an insol. digitonide.

Me ether: C₂₉H₄₆O. MW, 410. Cryst. from AcOEt-EtOH. M.p. 151-2°.

Acetyl: plates from Et₂O-EtOH. M.p. 175-6°.

Benzoyl: cryst. from EtOH. M.p. 168°. $[\alpha]_D -68^\circ$.

Palmityl: leaflets from AcOEt. M.p. 107-8°.

Phenylurethane: prisms from EtOH. M.p. 185°.

Tanret, *Compt. rend.*, 1908, **147**, 75.

Windaus, Inhoffen, Reichel, *Ann.*, 1934, **510**, 248.

Dunn, Heilbron, Phipers, Samant, Spring, *J. Chem. Soc.*, 1934, 1576.

Ergotamine

C₃₃H₃₅O₅N₅

MW, 581

Constituent of Ergot alkaloids. Rectangular

plates from Me₂CO.Aq. M.p. 213-14° decomp. Easily sol. Py, PhNO₂. Sol. Et₂O, CHCl_3 , C₆H₆. Insol. pet. ether. Sol. NaOH.Aq. Insol. Na₂CO₃. $[\alpha]_{5461}^{20} -181^\circ$. $[\alpha]_{5790}^{20} -159^\circ$ in CHCl_3 . Boiling MeOH \rightarrow ergotamine. Alc. KOH \rightarrow ergine.

Smith, Timmis, *J. Chem. Soc.*, 1930, 1390; 1932, 1543.

Soltys, *Ber.*, 1932, **65**, 553.

Ergotamine

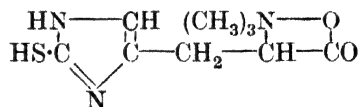
C₃₃H₃₅O₅N₅

MW, 581

Constituent of Ergot alkaloids. Plates from EtOH. M.p. 252° decomp. $[\alpha]_{5461}^{18} +450^\circ$, $[\alpha]_{5790}^{18} +385^\circ$ in CHCl_3 . Easily sol. Py. Sol. CHCl_3 , PhNO₂. Spar. sol. MeOH, EtOH, Me₂CO, AcOEt, C₆H₆. Insol. pet. ether. Insol. dil. alkalis or alkali carbonates. Formed when ergotamine is boiled with MeOH. Alc. KOH \rightarrow ergine.

See above references.

Ergothioneine (Thioneine, thiasine)



C₉H₁₅O₂N₃S

MW, 229

Plates + 2H₂O. M.p. 290° decomp. $[\alpha]_D +116.5^\circ$. Gives ppt. with Meyer's reagent and HgCl₂, but not with picric or tannic acids. FeCl₃ \rightarrow trimethylhistidine.

Akabori, *Ber.*, 1933, **66**, 151.

Barger, Ewins, *J. Chem. Soc.*, 1911, **99**, 2336.

Tanret, *Compt. rend.*, 1909, **149**, 222.

Ergotinine

C₃₅H₃₉O₅N₅

MW, 609

Occurs in *Claviceps purpurea*, parasitic on cereals. Prisms from Me₂CO.Aq. M.p. 239° decomp., sinters at 210°. $[\alpha]_{5461}^{20} +459^\circ$ in CHCl_3 . Slightly sol. H₂O. Mod. sol. hot EtOH, C₆H₆. Alc. KOH \rightarrow ergine. Blue-violet fluor. in acid sols. Sol. in H₂SO₄ + FeCl₃ \rightarrow orange col. changing to blue. Hyd. (EtOH + H₃PO₄) \rightarrow ergotoxine.

Barger, Carr, *J. Chem. Soc.*, 1907, **91**, 337.

Barger, Ewins, *J. Chem. Soc.*, 1918, **113**, 235.

Soltys, *Ber.*, 1932, **65**, 553.

Smith, Timmis, *J. Chem. Soc.*, 1931, 1888.

Jacobs, Craig, *J. Biol. Chem.*, 1935, **110**, 521.

Ergotoxine

$C_{35}H_{41}O_6N_5$ MW, 627

Prisms + $\frac{1}{2}C_6H_6$ from C_6H_6 . Loses C_6H_6 and melts at 190–200°. $[\alpha]_{D}^{25} -226^\circ$ in $CHCl_3$. Sol. EtOH, MeOH, Et_2O , boiling C_6H_6 , caustic alkalis. Insol. H_2O . Hot MeOH \rightarrow ergotinine. Alc. KOH \rightarrow ergine. Pptd. by alkaloid reagents.

B.HCl: plates. M.p. 205°.

$B_2H_2C_2O_4$: plates. M.p. 179° decomp.

$B_2H_3PO_4 \cdot H_2O$: needles. M.p. 186–7° decomp.

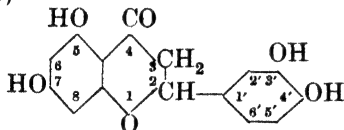
$B_2C_2H_5SO_3H \cdot 2C_2H_5OH$: m.p. 209°.

Smith, Timmis, *J. Chem. Soc.*, 1930, 1390.

Barger, Ergot and Ergotism, 1931. (Text-book.)

See also previous references.

Eriodictyol (5 : 7 : 3' : 4' - Tetrahydroxy-flavanone)



$C_{15}H_{12}O_6$ MW, 288

Occurs in leaves of *Eriodictyon californicum* Dene, and *Eriodictyon glutinosum* Benth. Plates from EtOH. M.p. 267°. Mod. sol. hot EtOH, AcOH. Spar. sol. boiling H_2O . Sol. alkalis and alkali carbonates.

Acetyl deriv.: m.p. 137°.

3'-Me ether: see Homoeriodictyol.

7 : 3' : 4' - Tri-Me ether: $C_{18}H_{18}O_6$. MW, 330. Needles. M.p. 136°.

Shinoda, Sato, *Chem. Abstracts*, 1929, 23, 4210.

Tutin, *J. Chem. Soc.*, 1910, 97, 2054.

Power, Tutin, *J. Chem. Soc.*, 1907, 91, 895.

Eriodictyonone.

See Homoeriodictyol.

Erucic Acid (*cis*- Δ^{12} -Docosenoic acid. Cf. Brassidic Acid)



$C_{22}H_{42}O_2$ MW, 338

Present as glyceride in rape and many other vegetable oils. Cryst. from MeOH. M.p. 33·5–34°. B.p. 241–3°/5 mm. Nitrogen oxides \rightarrow brassidic acid.

Me ester: $C_{23}H_{44}O_2$. MW, 352. B.p. 221·2°/5 mm.

Et ester: $C_{24}H_{46}O_2$. MW, 366. B.p. 229–30°/5 mm.

Amide: $C_{22}H_{43}ON$. MW, 337. M.p. 65–6°.

Anhydride: $C_{44}H_{82}O_3$. MW, 658. M.p. 47·5–48°.

Anilide: m.p. 65–6°.

Noller, Talbot, *Organic Syntheses*, 1930, X, 44.

Holde, Zadek, *Ber.*, 1923, 56, 2052.

Erucyl Alcohol (*Docosenol, docosenyl alcohol, 1-hydroxydocosene*)



$C_{22}H_{44}O$ MW, 324

Cryst. from Me_2CO or MeOH. M.p. 34·5–35·5°. B.p. 240·5–241·5°/10 mm., 199°/0·2 mm. Sol. EtOH, AcOH, C_6H_6 , pet. ether. Red. \rightarrow docosyl alcohol.

Dibromide: m.p. 45°.

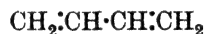
Phenylurethane: m.p. 86–86·5°.

Willstätter, Mayer, Hüni, *Ann.*, 1911, 378, 101.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, 20, 527.

Bleyberg, Ulrich, *Ber.*, 1931, 64, 2504.

Erythrene (1 : 3-Butadiene, divinyl)



C_4H_6 MW, 54

Gas. B.p. –2·6°. Heated 10 days at 110–20° \rightarrow butadiene caoutchouc (synthetic rubber, artificial rubber). Br in $CHCl_3 \rightarrow$ 1 : 4-dibromobutylene-2. Excess Br \rightarrow 1 : 2 : 3 : 4-tetrabromobutane.

Tetrachloro deriv.: prisms. M.p. 72–3°. B.p. 130–40°/50 mm.

Thiele, *Ann.*, 1899, 308, 337.

Harries, *Ann.*, 1911, 383, 179.

Leyes, E.P., 329,748, (*Chem. Zentr.*, 1930, II, 133).

Ostromyslenski, Kjelbasinski, *Chem. Zentr.*, 1916, I, 875.

I.G., E.P., 307,945, (*Chem. Zentr.*, 1929, II, 217).

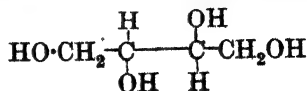
I.G., E.P., 291,748, (*Chem. Zentr.*, 1930, I, 1049).

I.G., E.P., 315,595, *ibid.*, 2161.

Erythrene-1 : 4-dicarboxylic Acid.

See Muconic Acid.

Erythritol (1 : 2 : 3 : 4-Tetrahydroxybutane)



$C_4H_{10}O_4$

MW, 122

l.-

Needles from EtOH. M.p. 88°. $[\alpha]_D -4.4^\circ$ in H_2O , $+11^\circ$ in 95% EtOH. Very sol. H_2O , boiling EtOH.

Di-benzylidene deriv.: m.p. 231°.

d.-

Needles from EtOH. M.p. 88.5–89°. $[\alpha]_D +4.3^\circ$ in H_2O , -11.1° in 95% EtOH. Very sol. boiling EtOH.

Di-benzylidene deriv.: m.p. 231°.

dl.-

Cryst. from EtOH. M.p. 72°. Very sol. H_2O .

Anhydride: m.p. 40°. B.p. 59–60°/30 mm.

Tetra-acetyl: m.p. 53°.

Di-benzylidene deriv., m.p. 220°.

Pariselle, *Ann. chim. phys.*, 1911, **24**, 401.

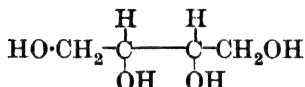
Maquenne, Bertrand, *Compt. rend.*, 1901, **132**, 1566.

Bertrand, *Ann. chim. phys.*, 1904, **3**, 207.

Maquenne, *Ann. chim. phys.*, 1901, **24**, 406.

Ruff, *Ber.*, 1901, **34**, 1371.

meso-Erythritol (1 : 2 : 3 : 4-Tetrahydroxybutane)


 $C_4H_{10}O_4$

MW, 122

Occurs in *Protococcus vulgaris* and *Trentepohlia Jolithus*. Prisms. M.p. 121.5°. B.p. 329–31°, 294–6°/200 mm. Sol. H_2O , hot EtOH. Insol. Et_2O . Heat of comb. C_p 504.1 Cal. (501.7 Cal.); C_p 504.4 Cal. (502.6 Cal.) Hot conc. $HCl \rightarrow$ 1 : 4-dichloro- ψ -butylene glycol. Heat with $P_2S_5 \rightarrow$ thiophene. $Me_2CO + HCl \rightarrow$ di-isopropylidene-erythritol, m.p. 56°, b.p. 105–6°/29 mm. *Sorbose bacterium* \rightarrow d-erythrulose.

1 : 4-Di-Et ether: $C_8H_{18}O_4$. MW, 178. M.p. 13.5°. B.p. 152°/35 mm., 144°/22 mm.

Tetranitrate: nitroerythritol. Plates from EtOH. M.p. 61°.

Tetra-acetyl: m.p. 89°.

Di-benzylidene deriv.: m.p. 201–2°.

de Luynes, *Ann. chim. phys.*, 1864, **2**, 399.

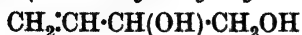
Ruff, *Ber.*, 1899, **32**, 3677.

Pariselle, *Ann. chim. phys.*, 1911, **24**, 399.

Prévost, *Compt. rend.*, 1926, **183**, 134.

Grinakowski, *Chem. Zentr.*, 1913, **II**, 2076.

Erythrol (3 : 4-Dihydroxybutylene-1)


 $C_4H_8O_2$

MW, 88

B.p. 196.5°, 98°/16 mm., 91–2°/12 mm. $D^{20}_{1.04703}$. Ba permanganate \rightarrow dl-erythritol.

Diacetyl: b.p. 202–3°.

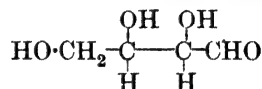
Di-phenylurethane: m.p. 125–6°.

Prévost, *Compt. rend.*, 1926, **183**, 1292; 1928, **186**, 1209.

Pariselle, *Compt. rend.*, 1910, **150**, 1344.

Henninger, *Ann. chim. phys.*, 1886, **7**, 213.

Erythrose (1 : 2 : 3-Trihydroxybutyraldehyde)


 $C_4H_8O_4$

MW, 120

l.-

Liq. Very sol. H_2O , EtOH. Exhibits mutarotation. $[\alpha]_D +21.5^\circ$ (equilibrium value in H_2O). Reduces Fehling's in the cold. Ox. \rightarrow l-erythronic acid \rightarrow mesotartaric acid. $NaHg \rightarrow$ meso-erythritol. Hot $HCl \rightarrow$ lactic acid. Phloroglucinol \rightarrow red. col.

Triacetyl: cryst. from EtOH. M.p. 134°.

Osazone: needles from C_6H_6 . M.p. 163–4°.

Benzylphenylhydrazone: needles. M.p. 105.5°.

Diacetamide: m.p. 210° decomp. Sol. H_2O . Insol. EtOH, Et_2O .

d.-

Liq. $[\alpha]_D -14.5^\circ$ (equilibrium value in H_2O).

Osazone: needles from H_2O . M.p. 164°.

Phenylhydrazone: m.p. 116°.

Benzylphenylhydrazone: needles from C_6H_6 -pet. ether. M.p. 105°.

dl.-

Osazone: m.p. 166–8°. Very sol. EtOH, Me_2CO , AcOH. Sol. Et_2O , hot C_6H_6 . Pract. insol. H_2O .

Ruff, *Ber.*, 1901, **34**, 1365; 1899, **32**, 3672.

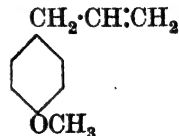
Wohl, *Ber.*, 1899, **32**, 3666.

Deulofeu, *J. Chem. Soc.*, 1930, 2603.

Erythroxyanthraquinone.

See 1-Hydroxyanthraquinone.

Esdragol (*Esdragol*, *chavicol methyl ether*, *methylchavicol*, *p-allylanisole*, *4-methoxy-1-allylbenzene*)


 $C_{10}H_{12}O$

MW, 148

Constituent of many essential oils. B.p. 215–16°, 96°/12 mm. $D^{15}_{0.9755}$. n_D^{17} 1.5230.

KMnO₄ in AcOH → *p*-methoxyphenylacetic acid. Alc. KOH → anethole.

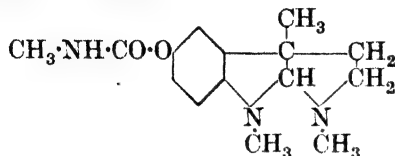
Klages, *Ber.*, 1899, **32**, 1439.

Tiffeneau, *Compt. rend.*, 1904, **139**, 482.

Eykman, *Ber.*, 1889, **22**, 2743.

Verley, D.R.P., 154,654, (*Chem. Zentr.*, 1904, II, 1354).

Eserine (Physostigmine)



C₁₅H₂₁O₂N₃

MW, 276

Occurs in calabar bean, *physostigma venenosum*. Two cryst. forms, m.ps. 86–7° and 105–6°. Sol. EtOH, Et₂O, CHCl₃. [α]_D –75.8°. Hot alkali in vacuo → eseroline.

N-Benzoyl: prisms. M.p. 115–16°.

B₂HBr: m.p. 224–6°.

B₂H₂AuCl₄: yellow leaflets. M.p. 163–5°.

B₂H₂PtCl₆: orange-yellow needles. M.p. 180°.

Picrate: needles. M.p. 114°.

Polonovski, Polonovski, *Bull. soc. chim.*, 1925, **37**, 744.

Stedman, *J. Chem. Soc.*, 1921, **119**, 891.

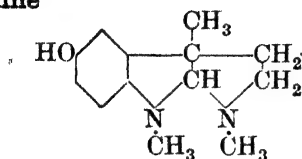
Barger, Stedman, *J. Chem. Soc.*, 1923, **123**, 758.

King, Liguori, Robinson, *J. Chem. Soc.*, 1933, 1475.

Eserine oxide.

See Geneserine.

Eseroline



C₁₃H₁₈ON₂

MW, 218

Needles from C₆H₆. M.p. 129°. [α]_D –107°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. pet. ether. Methyl isocyanate → eserine. Ox. in air → rubreserine.

Benzoyl: leaflets from AcOEt. M.p. 155–6°.

B₂HCl₂·H₂O: needles from AcOEt–EtOH. M.p. 212°.

Picrate: m.p. 195°.

Salway, *J. Chem. Soc.*, 1912, **101**, 980.

Barger, Stedman, *J. Chem. Soc.*, 1925, **127**, 247.

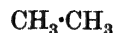
Petit, Polonovski, *Bull. soc. chim.*, 1893, **9**, 108.

Straus, *Ann.*, 1913, **401**, 350.

Estragol.

See Esdragol.

Ethane



C₂H₆

MW, 30

Gas. B.p. –88.63°, –107.9°/385 mm. D₀ 0.5719. Sol. EtOH, liq. oxygen. Spar. sol. H₂O. Vap. press. of liq. 14.1 mm. at –140°, 393.8 mm. at –100°, 1499 mm. at –75°. Heat of comb. C_p 370.4 Cal. Crit. temp. 32.1°. Crit. press. 48.8 atm. Decomp. at high temps. Ox. → C₂H₅OH → CH₃·COOH. Cl → chloroethane and dichloroethane.

Mermejo, Blas, *Anales Soc. españ. fis. quim.*, 1929, **28**, 228.

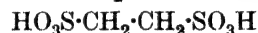
Frankland, *J. Chem. Soc.*, 1885, **47**, 236.

Sabatier, Senderens, *Compt. rend.*, 1897, **124**, 1360.

Ethane-dicarboxylic Acid.

See Methylmalonic Acid and Succinic Acid.

Ethane-1 : 2-disulphonic Acid



C₂H₆O₆S₂

MW, 190

Needles from AcOH–Ac₂O. M.p. 104°. Sol. EtOH. Na salt forms series of hydrates.

Di-Et ester: C₆H₁₄O₆S₂. MW, 246. Prisms from EtOH or Et₂O. M.p. 77.5°. Very sol. CHCl₃, C₆H₆. Spar. sol. EtOH, Et₂O.

Dichloride: C₂H₄O₄Cl₂S₂. MW, 227. Needles from Et₂O. M.p. 95°. Decomp. by H₂O.

Kohler, *Am. Chem. J.*, 1897, **19**, 732.

Ethanesulphonic Acid (Ethylsulphonic acid, sulphoethane)



C₂H₆O₃S

MW, 110

Very stable, forming hydrated salts with common metals.

Me ester: C₃H₈O₃S. MW, 124. B.p. 197.5–200.5°.

Et ester: C₄H₁₀O₃S. MW, 138. B.p. 213–14°, 104°/14 mm. D₄²⁰ 1.1461. n_D²⁰ 1.42684.

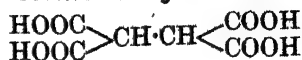
Amide: C₂H₇O₂NS. MW, 109. Prisms from Et₂O. M.p. 60°.

Chloride: C₂H₅O₂ClS. MW, 128.5. B.p. 171°. D₂₀²⁵ 1.357.

Böeseken, van Ockenburg, *Rec. trav. chim.*, 1914, **33**, 322.

Autenrieth, *Ann.*, 1890, **259**, 363.

Ethane-tetracarboxylic Acid



C₆H₄O₈

MW, 206

Needles or plates from Et_2O . M.p. 167–9° decomp. Sol. H_2O , EtOH , Et_2O . Spar. sol. AcOH , C_6H_6 . Heat \longrightarrow succinic acid + CO_2 .
 sym.-Di-Me ester: $\text{C}_8\text{H}_{10}\text{O}_8$. MW, 234. M.p. 158–60°.

Tetra-Me ester: $\text{C}_{10}\text{H}_{14}\text{O}_8$. MW, 262. Cryst. from Et_2O . M.p. 138°. Spar. sol. Et_2O . Insol. pet. ether.

sym.-Di-Et ester: $\text{C}_{10}\text{H}_{14}\text{O}_8$. MW, 262. Leaflets + $\frac{1}{2}\text{H}_2\text{O}$. M.p. 132–3° decomp. Sol. EtOH , Et_2O . Spar. sol. CHCl_3 , CS_2 .

Tetra-Et ester: $\text{C}_{14}\text{H}_{22}\text{O}_8$. MW, 318. Prisms. M.p. 76°.

Buchner, *Ber.*, 1892, **25**, 1157.

Mignonac, Rambeck, *Compt. rend.*, 1929, **188**, 1298.

Ethanol.

See Ethyl Alcohol.

Ethanolamine.

See 2-Aminoethyl Alcohol.

Ether.

See Diethyl Ether.

Etheserolene

$\text{C}_{14}\text{H}_{19}\text{O}_2\text{N}_2$ MW, 247

Prisms. M.p. 48°. Easily sol. org. solvents. Spar. sol. H_2O . Volatile in steam. $[\alpha]_D -98^\circ$ in EtOH .

Nitroso deriv.: m.p. about 97°.

Picrate: m.p. 98°.

Methiodide: m.p. 179°. $[\alpha]_D -40^\circ$ in H_2O .

Polonovski, Polonovski, *Bull. soc. chim.*, 1923, **33**, 973.

Stedman, Barger, *J. Chem. Soc.*, 1925, **127**, 252.

Ethine.

See Acetylene.

Ethionic Acid (Sulphuric ester of isethionic acid)



$\text{C}_2\text{H}_6\text{O}_7\text{S}_2$ MW, 206

Not known in free state. Concentration of aq. sol. \longrightarrow isethionic and sulphuric acids. The salts $\text{Na}_2\text{C}_2\text{H}_4\text{O}_7\text{S}_2\cdot\text{H}_2\text{O}$, $\text{K}_2\text{C}_2\text{H}_4\text{O}_7\text{S}_2\cdot\frac{1}{2}\text{H}_2\text{O}$, cryst. from H_2O . $\text{BaC}_2\text{H}_4\text{O}_7\text{S}_2\cdot\text{H}_2\text{O}$ is pptd. from H_2O by a little EtOH .

Anhydride: see Carbyl sulphate.

Magnus, *Ann.*, 1839, **32**, 249.

Claeson, *J. prakt. chem.*, 1879, **19**, 253.

I.G., E.P., 378,895, (*Chem. Zentr.*, 1932, **H**, 3960).

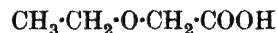
Ethocaine.

See Novocaine.

p-Ethoxyacetanilide.

See under p-Phenetidine.

Ethoxyacetic Acid (Glycollic acid ethyl ether)



$\text{C}_4\text{H}_8\text{O}_3$ MW, 104

Liq. B.p. 156–7°/16 mm. $k = 2.50 \times 10^{-4}$ at 25°. D_4^{20} 1.1021. n_D^{20} 1.417.

Me ester: $\text{C}_5\text{H}_{10}\text{O}_3$. MW, 118. B.p. 147–8°/734 mm.

Et ester: $\text{C}_6\text{H}_{12}\text{O}_2$. MW, 132. B.p. 152°/760 mm.

Phenyl ester: $\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. B.p. 139°/18 mm.

Benzyl ester: $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. B.p. 155°/21 mm.

p-Bromophenacyl ester: $\text{C}_{12}\text{H}_{13}\text{O}_4\text{Br}$. MW, 301. M.p. 104–8°.

Chloride: $\text{C}_4\text{H}_7\text{O}_2\text{Cl}$. MW, 122.5. B.p. 123–4°.

Anhydride: $\text{C}_8\text{H}_{14}\text{O}_5$. MW, 190. B.p. 142–3°/125 mm.

Amide: $\text{C}_4\text{H}_9\text{O}_2\text{N}$. MW, 103. M.p. 80–2°.

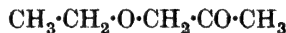
Nitrile: $\text{C}_4\text{H}_7\text{ON}$. MW, 85. B.p. 136–7°/753 mm.

Rothstein, *Bull. soc. chim.*, 1932, **51**, 838.

Sommelet, *Compt. rend.*, 1906, **143**, 827;

Ann. chim. phys., 1906, **9**, 484.

Ethoxyacetone (Ethyl acetonyl ether, ethyl-acetol)



$\text{C}_5\text{H}_{10}\text{O}_2$ MW, 102

Liq. B.p. 128°/760 mm. $D_4^{21.7}$ 0.9204. Misc. with H_2O , EtOH , Et_2O , in all proportions. Reduces $\text{NH}_3\cdot\text{AgNO}_3$ and Fehling's.

Oxime: b.p. 188°. Sol. H_2O .

Semicarbazone: m.p. 96°.

Phenylhydrazone: b.p. 165°/16 mm.

Fittig, Erlenbach, *Ann.*, 1892, **269**, 22.

See also last reference above.

Ethoxyallylene.

See Ethyl propargyl Ether.

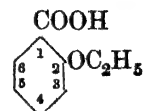
Ethoxyaniline.

See Phenetidine.

Ethoxybenzaldehyde.

See under Hydroxybenzaldehyde and Salicylaldehyde.

o-Ethoxybenzoic Acid (Salicylic acid ethyl ether)



$\text{C}_9\text{H}_{10}\text{O}_3$

MW, 166

M.p. 19.3–19.5°. Spar. sol. H₂O. Slightly volatile in steam.

Me ester: C₁₀H₁₂O₃. MW, 180. B.p. 245°/760 mm.

Et ester: C₁₁H₁₄O₃. MW, 194. B.p. 180–85°/113 mm.

Menthyl ester: m.p. 52–3°.

Kraut, *Ann.*, 1869, 150, 2.

Cohen, Dudley, *J. Chem. Soc.*, 1910, 97, 1742.

m-Ethoxybenzoic Acid (*Ethyl ether of m-hydroxybenzoic acid*).

Needles from H₂O. M.p. 137°. Sol. H₂O, EtOH, Et₂O, C₆H₆. Sublimes in needles.

Et ester: b.p. 172–3°/50 mm.

Menthyl ester: b.p. 230°/18 mm.

Chloride: C₉H₉O₂Cl. MW, 184.5. M.p. 27–8°. B.p. 135–40°/16 mm.

Amide: C₉H₁₁O₂N. MW, 165. M.p. 139–139.5°.

Fritsch, *Ann.*, 1903, 329, 71.

See also second reference above.

p-Ethoxybenzoic Acid (*Ethyl ether of p-hydroxybenzoic acid*).

Needles. M.p. 195–6°. Slightly sol. hot H₂O.

Et ester: b.p. 148–9°/14 mm.

Menthyl ester: m.p. 76–7°. B.p. 230–5°/16 mm.

Chloride: b.p. 160°/20 mm.

Hydrazide: m.p. 124°. *Hydrochloride*: m.p. 216°.

Cohen, Dudley, *J. Chem. Soc.*, 1910, 97, 1742.

2-p-Ethoxybenzoylbenzoic Acid.

See under 4'-Hydroxybenzophenone-2-carboxylic Acid.

α-Ethoxydi-1-naphthylmethane.

See under 1:1'-Dinaphthylcarbinol.

Ethoxydithioformic Acid.

See Xanthogenic Acid.

Ethoxyethylamine.

See 2-Aminodiethyl Ether.

Ethoxyethylbenzene.

See under Ethylphenol.

Ethoxyethylene.

See Ethyl vinyl Ether.

Ethoxyformanilide.

See under Phenetidine.

3-Ethoxy-n-heptane.

See under Ethyl-n-butylcarbinol.

p-Ethoxyphenylurea.

See Dulcin.

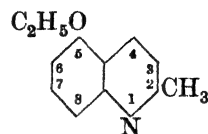
Ethoxypropylene oxide.

See under Glycide.

Ethoxypropionic Acid.

See under Hydracrylic Acid and Lactic Acid.

5-Ethoxyquinaldine (2-Methyl-5-ethoxy-quinoline)



C₁₂H₁₃ON MW, 187

Pale yellow viscous oil. B.p. 290–2°/760 mm., 174°/11 mm.

Ethiodide: orange-yellow needles. M.p. 166°.

Picrate: pale yellow needles. M.p. 206–7°.

Braunholtz, *J. Chem. Soc.*, 1922, 121, 169.

6-Ethoxyquinaldine (2-Methyl-6-ethoxy-quinoline).

Plates from petrol, m.p. 71°. Plates + 1H₂O from EtOH.Aq., m.p. 58–9°.

B.HCl: colourless needles. M.p. 184–6°.

Ethiodide: yellow needles from EtOH. M.p. 182°.

Picrate: pale yellow needles. M.p. 192°.

See previous reference.

7-Ethoxyquinaldine (2-Methyl-7-ethoxy-quinoline).

Pale yellow viscous oil. B.p. 307–8°/770 mm. *Ethiodide*: yellow prisms. M.p. 216–18° decomp.

Picrate: pale yellow needles. M.p. 213°.

See previous reference.

5-Ethoxysalicylic Acid.

See under Gentisic Acid.

β-Ethoxystyrene.

See Ethyl styryl Ether.

Ethyl

C₂H₅ MW, 29

Obtained by thermal decomp. of lead tetraethyl. Reacts with Sb, Zn, Cd, Pb → a complex mixture of metallic alkyls. With Hg → mercury diethyl. With Na → sodium ethyl. With Cl₄ → ethyl iodide.

Simons, Dull, *J. Am. Chem. Soc.*, 1933, 55, 2696.

N-Ethylacetamide (*Acetylmethylamine, acetethylamide*)

CH₃·CO·NH·CH₂·CH₃ MW, 87

Oily liq. B.p. 205°. *D*₄²⁵ 0.942. Sol. H₂O,

EtOH. HCl \rightarrow C_4H_9ON , HCl, white needles, m.p. 60°.

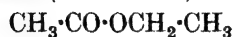
Wallach, *Ann.*, 1873, **184**, 108.

Titherley, *J. Chem. Soc.*, 1901, **79**, 401.

Ethylacetanilide.

See under Amino-ethylbenzene, and Ethylaniline.

Ethyl acetate (Acetic ester)



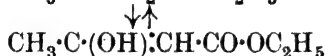
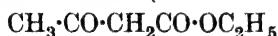
$C_4H_8O_2$ MW, 88

F.p. -83.6°. B.p. 77.1°. D_4^{20} 0.9245, D_4^{20} 0.9003 (0.8990). Sol. 13 parts H_2O at 15°. Misc. with most org. solvents. n_D^{25} 1.37005. Mol. b.p. elevation 27.9°. $NH_3 \rightarrow$ acetamide.

Pabst, *Bull. soc. chim.*, 1880, **33**, 350.

Wade, *J. Chem. Soc.*, 1905, **87**, 1656.

Ethylacetoacetate (Acetoacetic ester)



$C_6H_{10}O_3$ MW, 130

B.p. 181°, 100°/80 mm., 88°/29 mm., 74°/14 mm. D_4^{20} 1.0282. n_D^{25} 1.42092 (1.41976). Spar. sol. H_2O . Misc. with most org. solvents. Sol. dil. alkalis, pptd. by CO_2 . Forms Na deriv. and bisulphite comp. Gives violet col. with $FeCl_3$. $NaHg \rightarrow$ 2-hydroxybutyric ester. Conc. alkali \rightarrow acetic acid + C_2H_5OH . Dil. acid \rightarrow acetone + C_2H_5OH + CO_2 .

Semicarbazone: needles from Et_2O . M.p. 129° decomp. Sol. hot H_2O . Boiling $H_2O \rightarrow$ 3-methyl-5-pyrazolone.

Phenylhydrazone: needles. M.p. 50°. Oxidised by air. Sol. EtOH. Alc. KOH or dil. HCl \rightarrow 3-methyl-1-phenyl-5-pyrazolone.

Acetyl: see 2-Acetoxyacetic Ester.

Anil: see under 2-Anilinoacetic Acid.

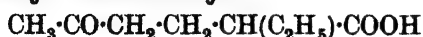
Inglis, Roberts, *Organic Syntheses*, 1926, **VI**, 36.

Snell, McElvain, *J. Am. Chem. Soc.*, 1931, **53**, 2310.

1-Ethylacetoacetic Acid.

See 1-Acetobutyric Acid.

1-Ethyl-3-acetobutyric Acid



$C_8H_{14}O_3$ MW, 158

B.p. 158°/9 mm.

Semicarbazone: cryst. from EtOH- Et_2O . M.p. 125°.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 769.

Ethylacetomalonic Acid



$C_7H_{10}O_5$ MW, 174

Di-Et ester: $C_{11}H_{18}O_5$. MW, 230. B.p. 130-1°/16 mm. D_4^{25} 1.0542. Very sol. Et_2O , EtOH.

Et ester-nitrile: $C_9H_{13}O_3N$. MW, 183. Liq. with unpleasant odour. B.p. 130°/35 mm. D_4^{20} 0.976. Sol. EtOH, Et_2O . Insol. H_2O , alkalis.

Auwers, Auffenberg, *Ber.*, 1917, **50**, 942.

Ethyl acetonyl Ether.

See Ethoxyacetone.

sym.-Ethylacetonylethylene.

See 3-Heptenone-6.

Ethylacetylene.

See 1-Butine.

1-Ethylacrylic Acid (1-Methylenebutyric acid, 1-butylene-2-carboxylic acid)



$C_5H_8O_2$ MW, 100

Oil with rancid odour. M.p. -16°. B.p. 83°/15 mm., 180°/760 mm.

Et ester: $C_7H_{12}O_2$. MW, 128. B.p. 137°.

Chloride: C_5H_7OCl . MW, 118.5. B.p. 38.5°/30 mm.

Amide: C_5H_9ON . MW, 99. Cryst. from C_6H_6 . M.p. 83.5°.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 761.

Mannich, Ganz, *Ber.*, 1922, **55B**, 3493.

2-Ethylacrylic Acid (1-Butylene-1-carboxylic acid, propylideneacetic acid, α -pentenoic acid)



$C_5H_8O_2$ MW, 100

Exists in *cis* and *trans* forms, of which the *trans* is more stable. The nitriles in presence of NaOH or PhONa undergo mutual isomerisation.

Trans:

M.p. 10°. B.p. 108°/17 mm., 99°/10 mm., 71°/2 mm. Mod. sol. H_2O . D_4^{15} 0.992. $k = 1.48 \times 10^{-5}$ at 25°.

Et ester: $C_7H_{12}O_2$. MW, 128. B.p. 157.6°/745 mm., 48°/11 mm. Dibromide, b.p. 117.5°/14 mm.

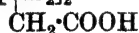
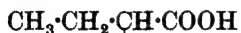
Chloride: C_5H_7OCl . MW, 118.5. B.p. 37°/11 mm.

Amide: C_5H_9ON . MW, 99. Plates. M.p. 148°.

Nitrile: C_5H_7N . MW, 81. B.p. 143-4°/760 mm., 73-4°/72 mm. n_D^{20} 1.4266. D_4^{20} 0.8266.

Cis:

B.p. 201-2°/760 mm., 101.5-102.5°/15 mm.

Nitrile: b.p. 127-8°/760 mm., 59-59.6°/72 mm. n_D^{20} 1.4211. D_4^{20} 0.8208.Auwers, *Ann.*, 1923, **432**, 63.Bruylants, Jmoudsky, *Bulletin de la classe des sciences académie royale de Belgique*, 1931, **17**, 1161.Bourguel, Yvon, *Compt. rend.*, 1926, **182**, 224.**1-Ethyladipic Acid** (*Hexane-1:4-dicarboxylic acid*) $\text{C}_8\text{H}_{14}\text{O}_4$

MW, 174

M.p. 49° (48-50°). B.p. 225-6°/20 mm. $k = 4.15 \times 10^{-5}$ at 24.2°. $\text{CrO}_3 \rightarrow$ succinic acid.Lean, Lees, *J. Chem. Soc.*, 1897, **71**, 1067.Best, Thorpe, *J. Chem. Soc.*, 1909, **95**, 713.**Ethylal.**

See under Formaldehyde.

Ethyl Alcohol (*Ethanol, hydroxyethane*) $\text{C}_2\text{H}_6\text{O}$

MW, 46

F.p. -117.3° (-112.3°). B.p. 78.5°, 54.8°/275 mm., 39.8°/130 mm., 30°/79 mm., 22.1°/49.5 mm., 14.35°/31.1 mm., 8.1°/21 mm., 4°/16 mm. D_4^{20} 0.80645, D_4^{20} 0.7978, D_4^{20} 0.7907, D_4^{20} 0.7893, D_4^{20} 0.78513, D_4^{20} 0.76300, D_4^{20} 0.74620. n_D^{15} 1.36330, n_D^{20} 1.36104, n_D^{25} 1.35954. Heat of comb. C_2 325.7 (328) Cal. Sp. heat 0.612 (16-40.5°). Crit. temp. 243°. Crit. press. 62.7 atm. Crit. vol. 0.0071. Mol. b.p. elevation 11.7°. Hygroscopic. Misc. with H_2O and most org. solvents. Dissolves CaCl_2 , I, Br, P and S. Contraction in vol. and evolution of heat on mixing with H_2O . Na \rightarrow sodium ethoxide + H_2 . Cl \rightarrow chloral alcoholate. $\text{H}_2\text{SO}_4 \rightarrow$ ethyl hydrogen sulphate, diethyl ether, and ethylene. $\text{PCl}_5 \rightarrow$ ethyl chloride. I + KOH \rightarrow iodoform. Ox. \rightarrow acetaldehyde \rightarrow acetic acid. Obtained anhydrous by azeotropic distillation with C_6H_6 , or dehydrated with K_2CO_3 , CaO, CaSO_4 , etc.

Ethyl allocinnamate.

See under Ethyl cinnamate.

Ethylallocinnamic Acid.

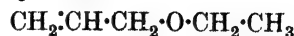
See under Ethylcinnamic Acid.

Ethylallylamine $\text{C}_5\text{H}_{11}\text{N}$

MW, 85

Liq. with strong ammoniacal odour. B.p. 84°. Misc. with H_2O in all proportions. $\text{B, H}_2\text{PtCl}_6$: yellow needles. M.p. 154°.Rinne, *Ann.*, 1873, **168**, 262.Liebermann, Paal, *Ber.*, 1883, **16**, 531.**Ethylallylcarbinol.**

See 1-Hexenol-4.

Ethyl allyl Ether $\text{C}_5\text{H}_{10}\text{O}$

MW, 86

B.p. 66-7°/743 mm. D_4^{20} 0.7651. n_D^{20} 1.3856.Brühl, *Ann.*, 1880, **200**, 178.**Ethyl allyl Ketone.**

See 1-Hexenone-4.

Ethylamine $\text{C}_2\text{H}_7\text{N}$

MW, 45

B.p. 16.6°. D_4^{20} 0.7057. $k = 5.2 \times 10^{-4}$ at 25°. Inflammable. Misc. with H_2O : salted out by NaOH. NaOCl \rightarrow N-chloro deriv. Cl in dil. aq. sol. \rightarrow N-dichloro deriv. Dissolves K and Cs with formation of their ethylamides.

 $\text{B}_2, 1\text{H}_2\text{O}$: m.p. -71.2°. $\text{B}_2, 5\frac{1}{2}\text{H}_2\text{O}$: m.p. -7.48°. B, HCl : plates from EtOH. M.p. 108°. B, HBr : needles or plates from EtOH. M.p. 159.5°. B, HI : needles from H_2O . M.p. 188.5°. Spar. sol. EtOH. B, HAuCl_4 : m.p. 194-6°. Picrate : yellow prisms from MeOH. M.p. 165°.

N-Acetyl: see N-Ethylacetamide.

N-Benzoyl: see N-Ethylbenzamide.

N-Benzenesulphonyl: m.p. 58°.

N-p-Toluenesulphonyl: m.p. 63°.

Hofmann, *Ber.*, 1882, **15**, 753.Tafel, *Ber.*, 1886, **19**, 1926.Werner, *J. Chem. Soc.*, 1918, **113**, 899.**Ethylamine-sulphonic Acid.**

See Taurine.

Ethylaminoacetic Acid.

See Ethylglycine.

Ethyl 1-aminoacetoacetate (*1-Aminoacetoacetic ester*) $\text{C}_6\text{H}_{11}\text{O}_3\text{N}$

MW, 145

Not known in free state.

B, HCl : white needles from EtOH-Et₂O. M.p. 95° decomp. Hygroscopic. Very sol. H_2O , EtOH. Insol. Et₂O. Reduces Fehling's. Alkalis \rightarrow dimethylpyrazine-dicarboxylic ester.

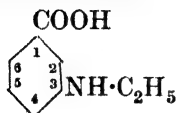
Picrate: m.p. 129° decomp.

Gabriel, Posner, *Ber.*, 1894, 27, 1141.*

N-Ethyl-o-aminobenzoic Acid.

See Ethylanthranilic Acid.

N-Ethyl-m-aminobenzoic Acid



$\text{C}_9\text{H}_{11}\text{O}_2\text{N}$

MW, 165

Needles. M.p. 112°. Very sol. EtOH, Et₂O. Spar. sol. cold H₂O.

Griess, *Ber.*, 1872, 5, 1038.

N-Ethyl-p-aminobenzoic Acid.

Cryst. from C₆H₆. M.p. 177-8°. Sol. most org. solvents.

N-Acetyl: needles from H₂O. M.p. 180°.

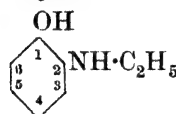
N-Chloroacetyl: plates from H₂O. M.p. 163-4°.

Houben, Freund, *Ber.*, 1909, 42, 4822.

Ethyl o-aminobenzyl Ether.

See under o-Aminobenzyl Alcohol.

o-Ethylaminophenol (o-Hydroxy-ethyl-aniline, 1-hydroxy-2-ethylaminobenzene)



$\text{C}_8\text{H}_{11}\text{ON}$

MW, 137

Plates from C₆H₆. M.p. 107-5°. Very sol. EtOH. Sol. hot C₆H₆. Spar. sol. CHCl₃, Et₂O. *B.HCl*: needles. M.p. 220°. Sol. H₂O, EtOH.

Me ether: *N*-ethyl-o-anisidine. C₉H₁₃ON. MW, 151. Colourless oil. B.p. 228-9°/728 mm., 117°/31 mm. *Hydrochloride*: plates. M.p. 193°.

Et ether: *N*-ethyl-o-phenetidine. C₁₀H₁₅ON. MW, 165. B.p. 234-6°/751 mm. D₁₈ 1.021. Misc. in all proportions with Et₂O, C₆H₆, CS₂. Volatile in steam.

Foerster, *J. prakt. Chem.*, 1866, 21, 346.

Diepolder, *Ber.*, 1898, 31, 495.

m-Ethylaminophenol (m-Hydroxy-ethyl-aniline, 1-hydroxy-3-ethylaminobenzene).

Feathery cryst. from C₆H₆-pet. ether. M.p. 62°. B.p. 176°/12 mm. Very sol. CHCl₃. Sol. hot H₂O, EtOH, Et₂O, C₆H₆. Spar. sol. pet. ether.

Gnehm, Scheutz, *J. prakt. Chem.*, 1901, 63, 423.

Badische, D.R.Ps., 76,419, 48,151.

Dict. of Org. Comp.—II.

p-Ethylaminophenol (p-Hydroxy-ethyl-aniline, 1-hydroxy-4-ethylaminobenzene).

Needles from H₂O. M.p. 103-4°.

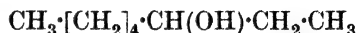
Acetate: C₁₀H₁₃O₂N. MW, 179. M.p. 187°.

Galatis, *Ber.*, 1927, 60, 1402.

Ethyl aminophenyl Ketone.

See Aminopropiophenone.

Ethyl-n-amylcarbinol (Octanol-3,3-hydroxy-octane)



$\text{C}_8\text{H}_{18}\text{O}$

MW, 130

d-.

Present in Japanese peppermint oil. B.p. 178-5-179-5°, 76°/16 mm. D₄²⁰ 0.8247. *n*_D²⁰ 1.4252. $[\alpha]_D + 11.13^\circ$ in EtOH.

Acid phthalate: plates from pet. ether. M.p. 66-8°. $[\alpha]_D + 21.67^\circ$ in EtOH.

l-.

B.p. 82°/24 mm. $[\alpha]_D^{25} - 7.40^\circ$ in EtOH.

1-Naphthylurethane: cryst. from EtOH.Aq. M.p. 79-80°. $[\alpha]_D^{20} - 2.48^\circ$ in EtOH.

dl-.

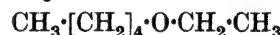
B.p. 176-177.5°. D₁₅¹⁵ 0.8286. *n*_D²⁰ 1.42785.

Acid phthalate: plates from pet. ether. M.p. 62-3°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1944.

Levene, Walti, *J. Biol. Chem.*, 1931, 94, 593.

Ethyl n-amyl Ether



$\text{C}_7\text{H}_{16}\text{O}$

MW, 116

B.p. 119-20°. Very spar. sol. H₂O. HI → *n*-amyl iodide + ethyl iodide.

Blaise, Picard, *Ann. chim. phys.*, 1912, 25, 259.

Ethyl active-amyl Ether



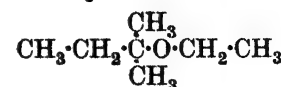
$\text{C}_7\text{H}_{16}\text{O}$

MW, 116

B.p. 107.5-109°/735.7 mm. D₄¹⁸ 0.759. *n*_D^{18.9} 1.3900. $[\alpha]_D^{18} + 0.61^\circ$.

Guye, Chavanne, *Bull. soc. chim.*, 1896, 15, 302.

Ethyl tert.-amyl Ether



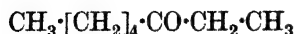
$\text{C}_7\text{H}_{16}\text{O}$

MW, 116

B.p. 102°. D¹⁸ 0.751.

Kondakoff, *J. Chem. Soc. Abstracts*, 1888, 54, 802.

Ethyl *n*-amyl Ketone (3-Keto-octane, octanone-3)



C₈H₁₆O MW, 128

B.p. 165–6° (170°). D¹⁵ 0.8255. n_D²⁰ 1.41556.

Semicarbazone: cryst. from EtOH.Aq. M.p. 112° (slow heat.), (117–117.5°).

Schimmel, *Chem. Zentr.*, 1912, I, 1717.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936, 1944.

Ethyl active-amyl Ketone (5-Keto-3-methylheptane, 3-methylheptanone-5)



C₈H₁₆O MW, 128

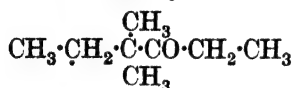
Colourless liq. with odour of mint. B.p. 161°. Prac. insol. H₂O. Does not form bisulphite comp.

Semicarbazone: m.p. 96°.

Guerbet, *Compt. rend.*, 1910, 150, 184;

Bull. soc. chim., 1910, 7, 211.

Ethyl tert.-amyl Ketone (4-Keto-3:3-dimethylhexane, 3:3-dimethylhexanone-4)



C₈H₁₆O MW, 128

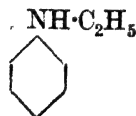
B.p. 150.5–152°. D²⁰ 0.8285. More sol. in cold than in hot H₂O. NaOBr or CrO₃ → CH₃·CH₂·C(CH₃)₂·COOH.

Semicarbazone: needles from ligroin. M.p. 98°.

Meerwein, *Ann.*, 1913, 396, 252.

Parry, *J. Chem. Soc.*, 1915, 107, 110.

Ethylaniline



C₈H₁₁N MW, 121

B.p. 204.72°/760 mm., 187.5°/500 mm., 163.8°/250 mm., 136.8°/100 mm., 119.1°/50 mm., 102.5°/25 mm., 97.5–98°/18 mm., 83.8°/10 mm. Solidifies below –80°. Sol. most org. solvents. D₄²⁰ 0.9625, D₄¹ 0.9727, D₁₅¹⁵ 0.9643, D₂₀²⁰ 0.9583. n_D²⁰ 1.55593. k = 4.17 × 10^{–10} at 19°. Heat of comb. C_p 1126.88 Cal., C_v 1125.60 Cal. Passed through red hot tube → indole. H → ethylcyclohexylamine. Br in CH₃COOH →

4-bromo-, 2:4-dibromo-, and 2:4:6-tribromo-ethylaniline. H₂SO₄ → ethylaniline *m*- and *p*-sulphonic acids. HNO₂ → ethylphenyl-nitrosamine. HNO₃ → *m*- and *p*-nitroethylaniline. Does not give violet col. with bleaching powder solution.

B.HCl: needles. M.p. 172–5° (176°). Sol. H₂O.

B.HBr: plates from EtOH. M.p. 165–6°. Sol. H₂O.

Oxalate: m.p. 112–14°.

N-Acetyl: N-ethylacetanilide. C₁₀H₁₃ON. MW, 163. M.p. 55°.

N-Benzoyl: N-ethylbenzanilide. C₁₅H₁₅ON. MW, 225. M.p. 60°.

N-*p*-Toluenesulphonyl: m.p. 87°.

N-*p*-Bromobenzenesulphonyl: m.p. 91°.

N-*m*-Nitrobenzenesulphonyl: m.p. 100°.

C₈H₁₁N, C₆H₃(NO₂)₃-1:3:5: red needles. M.p. 55–6°.

Picrate: m.p. 132° (137.5–138°).

Ullmann's Enzyklopädie der techn. Chemie, Vol. I, 445.

Lazier, Adkins, *J. Am. Chem. Soc.*, 1924, 46, 741.

Finzi, *Ann. chim. applicata*, 1925, 15, 41.

Guyot, Fournier, *Bull. soc. chim.*, 1930, 47, 203.

I.G., E.P., 334,579, (*Chem. Abstracts*, 1931, 25, 964).

For methods of separation from diethylaniline, etc., see also

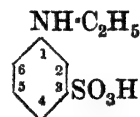
Piutti, *Ann.*, 1885, 227, 182.

Blume, Klöffler, *Ber.*, 1905, 38, 3276.

B.D.C., E.P., 270,930, (*Chem. Abstracts*, 1928, 22, 1594).

I.G., E.P., 333,349, (*Chem. Abstracts*, 1931, 25, 522).

Ethylaniline-*m*-sulphonic Acid (N-Ethylmetanilic acid)



C₈H₁₁O₃NS MW, 201

Needles from H₂O. Decomp. at 294°. 100 parts H₂O diss. 2.15 parts at 15°. k = 1.58 × 10^{–4}. Alk. fusion → *m*-ethylaminophenol. Na salt + 2H₂O, leaflets from EtOH.Aq. Ba salt readily sol. H₂O.

Badische, D.R.P., 48,151.

Gnehm, Scheutz, *J. prakt. Chem.*, 1901, 63, 414.

Ethylaniline-*p*-sulphonic Acid (*N*-Ethylsulphanilic acid).

Plates from H_2O . Decomp. at 258° . 100 parts H_2O diss. 10.4 parts at 13° . $k = 1.26 \times 10^{-4}$. Na salt + $3\text{H}_2\text{O}$, plates or prisms, readily sol. H_2O . Ag salt + $1\text{H}_2\text{O}$, plates, spar. sol. H_2O . Ba salt + $2\text{H}_2\text{O}$, plates.

Gnehm, Scheutz, *J. prakt. Chem.*, 1901, **63**, 416.

Bayer, D.R.P., 295,104, (*Chem. Zentr.*, 1916, II, 1097).

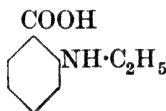
***N*-Ethylanisidine.**

See under Ethylaminophenol.

Ethylanisole.

See under Ethylphenol.

Ethylanthranilic Acid (*N*-Ethyl-*o*-aminobenzoic acid)



$\text{C}_9\text{H}_{11}\text{O}_2\text{N}$ MW, 165

Needles from EtOH.Aq. M.p. $153-4^\circ$. Blue fluor. in EtOH or Et_2O .

Me ester: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Oil with pleasant odour. B.p. $148-50^\circ/45$ mm.

Et ester: $\text{C}_{11}\text{H}_{15}\text{O}_2\text{N}$. MW, 193. Oil. B.p. $150-1^\circ/16$ mm., $142^\circ/11$ mm.

Amide: $\text{C}_9\text{H}_{12}\text{ON}_2$. MW, 164. Cryst. from hot H_2O . M.p. $128-9^\circ$.

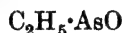
Nitrile: *o*-cyanoethylaniline. $\text{C}_9\text{H}_9\text{N}_2$. MW, 146. Needles from ligroin. M.p. 32° .

Houben, Brassert, *Ber.*, 1906, **39**, 3237.

Karrer, Nägeli, Weidmann, *Helv. Chim. Acta*, 1919, **2**, 248.

Finzi, *Ann. chim. applicata*, 1925, **15**, 41.

Ethylarsenious oxide



$\text{C}_2\text{H}_5\text{OAs}$ MW, 120

Oil. B.p. $158^\circ/10$ mm. Sol. Et_2O , Me_2CO , C_6H_6 . Rapidly oxidised by air.

Steinkopf, Mieg, *Ber.*, 1920, **53**, 1014.

Ethylarsine



$\text{C}_2\text{H}_7\text{As}$ MW, 106

Liq. with disagreeable odour. B.p. 36° . D_{20}^{22} 1.217. Very spar. sol. H_2O . $\text{C}_2\text{H}_5\text{I} \rightarrow$ tetraethylarsonium iodide. $\text{CH}_3\text{I} \rightarrow$ ethyltrimethylarsonium iodide. $\text{Br} \rightarrow$ ethyldibromoarsine. Poisonous.

Dehn, *Am. Chem. J.*, 1905, **33**, 143.

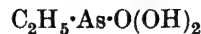
Ethylarsine dibromide.

See Ethyldibromoarsine.

Ethylarsine dichloride.

See Ethyldichloroarsine.

Ethylarsinic Acid (*Ethylarsonic acid*)



$\text{C}_2\text{H}_7\text{O}_3\text{As}$ MW, 154

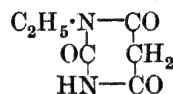
Cryst. from EtOH. M.p. 99.5° . 100 parts H_2O diss. 70 parts at 27° , 112 parts at 40° . 100 parts 95% EtOH diss. 39.4 parts at 25° .

La Coste, *Ann.*, 1881, **208**, 34.

Auger, *Compt. rend.*, 1903, **137**, 927.

Dehn, *Am. Chem. J.*, 1905, **33**, 129.

1-Ethylbarbituric Acid (*Malonyl-ethylurea*)

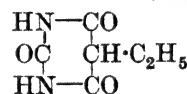


$\text{C}_6\text{H}_8\text{O}_3\text{N}_2$ MW, 156

Rectangular leaflets. M.p. $119-20^\circ$.

Biltz, Wittek, *Ber.*, 1921, **54**, 1038.

5-Ethylbarbituric Acid (*Ethylmalonyl-urea*)



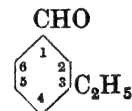
$\text{C}_6\text{H}_8\text{O}_3\text{N}_2$ MW, 156

Prisms from H_2O or EtOH. M.p. 194° (190°). Sol. H_2O , EtOH.

Merck, D.R.P., 146,948, (*Chem. Zentr.*, 1904, I, 68); D.R.P., 165,693, (*Chem. Zentr.*, 1906, I, 515).

Fischer, Dilthey, *Ann.*, 1904, **335**, 357.

***m*-Ethylbenzaldehyde** (*3-Aldehydoethylbenzene*)



$\text{C}_9\text{H}_{10}\text{O}$ MW, 134

Oil. B.p. $212^\circ/762$ mm.

Mayer, English, *Ann.*, 1918, **417**, 88.

***p*-Ethylbenzaldehyde** (*4-Aldehydoethylbenzene*).

B.p. 221° , $109-10^\circ/10$ mm. Odour resembles cuminaldehyde.

Oxime: m.p. 29° .

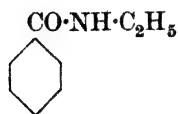
Semicarbazone: m.p. 199° .

Hydrazone: m.p. 101° .

v. Braun, Engel, *Ann.*, 1924, **436**, 304.

Fournier, *Compt. rend.*, 1903, **136**, 557.

N-Ethylbenzamide (Benzoylethylamine)

 $\text{C}_9\text{H}_{11}\text{ON}$

MW, 149

Needles from H_2O or EtOH . Aq. M.p. $70-71^\circ$. B.p. $298-300^\circ$, $285^\circ/745$ mm. Spar. sol. hot H_2O .

B, HCl : viscous oil. Hyd. by H_2O .

Gattermann, *Ann.*, 1888, **244**, 50.

Blacher, *Ber.*, 1895, **28**, 2358.

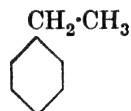
Titherley, *J. Chem. Soc.*, 1901, **79**, 393, 403.

Reid, *Am. Chem. J.*, 1911, **45**, 43.

Ethylbenzanilide.

See under Aminoethylbenzene and Ethylaniline.

Ethylbenzene (Phenylethane)

 C_8H_{10}

MW, 106

F.p. -93.9° (-94.4°). B.p. 136.15° ($135.5^\circ/760$ mm.), $30^\circ/10$ mm. Solubility in H_2O , 0.0013 mols. per litre at 15° . D_4^{20} 0.88457, D_4^{25} 0.8809, D_4^{30} 0.86690, D_{15}^{25} 0.8720, D_{25}^{35} 0.8650 (0.8646). n_D^{20} 1.50206, n_D^{25} 1.4990, n_D^{35} 1.49857, n_D^{40} 1.49594. Heat of comb. C_8 1089.8 Cal. CrO_3 or dil. $\text{HNO}_3 \rightarrow$ benzoic acid and acetophenone. $\text{CrO}_2\text{Cl}_2 \rightarrow$ phenylacetaldehyde, benzaldehyde, and acetophenone. $\text{MnO}_2 + \text{H}_2\text{SO}_4 \rightarrow$ benzaldehyde and acetophenone. Cl (cold) \rightarrow α -chloroethylbenzene and $\alpha\alpha$ -dichloroethylbenzene. Br (in the dark) \rightarrow 2- and 4-bromoethylbenzenes. Br (cold) \rightarrow α -bromoethylbenzene and $\alpha\alpha$ -dibromoethylbenzene. HNO_3 (D 1.475) \rightarrow 2- and 4-nitroethylbenzenes, 2 : 4-dinitroethylbenzene, and 2 : 4 : 6-trinitroethylbenzene. HNO_3 (D 1.075 at 100°) \rightarrow α -nitroethylbenzene. $\text{H}_2\text{SO}_4 \rightarrow$ ethylbenzene-*p*-sulphonic acid.

Picrate: light yellow cryst. M.p. 96.6° .

Béhal, Choay, *Bull. soc. chim.*, 1894, **11**, 207.

Radziewanowski, *Ber.*, 1894, **27**, 3235; 1895, **28**, 1139.

Cline, Reid, *J. Amer. Chem. Soc.*, 1927, **49**, 3153.

Z. Foldi, E.P., 319,273, (*Chem. Abstracts*, 1930, **24**, 2471).

Ethyl benzoate

 $\text{C}_9\text{H}_{10}\text{O}_2$

MW, 150

F.p. -34° . B.p. 212.9° ($211.7-211.9^\circ/760$ mm.), $142.2^\circ/100$ mm., $101.8^\circ/20$ mm., $87.2^\circ/10$ mm. D_4^{20} 1.0614, D_4^{25} 1.0509, D_4^{30} 1.0496, D_4^{35} 1.0422, D_4^{40} 1.0191. n_D^{20} 1.5068. $\text{NH}_3 \rightarrow$ benzamide. HNO_3 (D 1.52 at 0°) \rightarrow ethyl *m*-nitrobenzoate. $\text{Na} + \text{EtOH} \rightarrow$ hexahydrobenzoic acid. $\text{H}(\text{Ni}) \rightarrow$ ethyl hexahydrobenzoate.

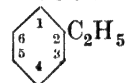
Fischer, Speier, *Ber.*, 1895, **28**, 3253.

Sabatier, Mailhe, *Compt. rend.*, 1911, **152**, 360.

Hofmann, Josephy, D.R.P., 292,543, (*Chem. Zentr.*, 1916, II, 113).

Finzi, *Ann. chim. applicata*, 1925, **15**, 41.

o-Ethylbenzoic Acid

 $\text{C}_9\text{H}_{10}\text{O}_2$

MW, 150

Needles from hot H_2O . M.p. 68° . B.p. $259^\circ/760$ mm. Sol. EtOH , Et_2O . Less sol. ligroin. Spar. sol. cold H_2O . Cl at $200^\circ \rightarrow$ tetrachloromethylphthalide. $\text{HNO}_3 + \text{H}_2\text{SO}_4 \rightarrow$ 4- and 5-nitro-*o*-ethylbenzoic acids. Electrolytic red. at $\text{Pb} \rightarrow$ *o*-ethylbenzyl alcohol.

Et ester: $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. B.p. $231^\circ/763$ mm.

Chloride: $\text{C}_9\text{H}_9\text{OCl}$. MW, 168.5. B.p. $219^\circ/744.5$ mm.

Amide: $\text{C}_9\text{H}_{11}\text{ON}$. MW, 149. Needles from hot H_2O . M.p. $151-3^\circ$.

Nitrile: *o*-cyanoethylbenzene. $\text{C}_9\text{H}_9\text{N}$. MW, 131. B.p. 212° .

Gabriel, Michael, *Ber.*, 1877, **10**, 2206.

Zincke, Frölich, *Ber.*, 1887, **20**, 2056, 2895.

Giebe, *Ber.*, 1896, **29**, 2534.

m-Ethylbenzoic Acid.

Needles from H_2O or dil. EtOH . M.p. 47° . Prac. insol. cold H_2O . Electrolytic red. at $\text{Pb} \rightarrow$ *m*-ethylbenzyl alcohol.

Nitrile: *m*-cyanoethylbenzene. B.p. $116-17^\circ/25^\circ$.

Voswinkel, *Ber.*, 1888, **21**, 2830.

Mayer, English, *Ann.*, 1918, **417**, 87.

p-Ethylbenzoic Acid.

Prisms from EtOH . Laminæ from H_2O . M.p. $110-11^\circ$ ($112-13^\circ$, 113.5°). Spar. sol. cold H_2O . Sol. hot H_2O , EtOH , Et_2O , CHCl_3 , C_6H_6 .

Et ester : b.p. 129–130°/15 mm.

Amide : laminae from H₂O. M.p. 115–16°.

Fittig, König, *Ann.*, 1867, **144**, 290.

Aschenbrandt, *Ann.*, 1883, **216**, 218.

Kindler, *Ann.*, 1927, **452**, 102.

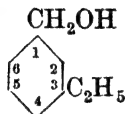
Ethylbenzoylacetic Acid.

See 1-Benzoylbutyric Acid.

Ethylbenzoylcarbinol.

See β-Hydroxybutyrophene.

m-Ethylbenzyl Alcohol (1-Hydroxymethyl-3-ethylbenzene)



C₉H₁₂O MW, 136

Colourless oil with aromatic odour. B.p. 227°/758 mm.

Mayer, English, *Ann.*, 1918, **417**, 87.

p-Ethylbenzyl Alcohol (1-Hydroxymethyl-4-ethylbenzene).

B.p. 115–17°/9 mm.

v. Braun, Engel, *Ann.*, 1924, **436**, 305.

Ethylbenzylamine



C₉H₁₃N MW, 135

B.p. 199° (194°). Sol. EtOH, Et₂O. Spar. sol. H₂O. D₁₅^{16.7} 0.9350. Heat of comb. C₉ 1286.8 Cal., C_p 1288.6 Cal. C₆H₅·NCO → phenylethylbenzylurea, m.p. 81°.

Wallach, *Ann.*, 1905, **343**, 73.

Pinner, Franz, *Ber.*, 1905, **38**, 1548.

Mailhe, *Bull. soc. chim.*, 1919, **25**, 322.

Ethylbenzylaniline (Benzylethylaniline)



C₁₅H₁₇N MW, 211

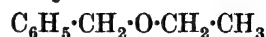
Pale yellow oil. B.p. 285–6°/710 mm. slight decomp., 185.5–186.5°/22 mm. D₁₅^{18.5} 1.001, D_{18.5} 1.034. Insol. H₂O. Sol. 5½ parts EtOH. Weak base. Nascent Br → 2 : 4 : 6-tribromoethyl-aniline. HNO₂ → 4-nitrosoethylbenzylaniline, m.p. 61–2°. HNO₃ + H₂SO₄ → ethyl-4-nitrobenzylaniline + ethyl-3-nitrobenzylaniline. HNO₃ (D 1.5) + AcOH → 4-nitroethylbenzylaniline. Intermediate for triphenylmethane dyestuffs.

Picrate : short prisms from CHCl₃-ligroin. M.p. 116–17° (111–12°).

Friedländer, *Ber.*, 1889, **22**, 588.

Stebbins, *J. Am. Chem. Soc.*, 1885, **7**, 42.

Ethyl benzyl Ether



C₉H₁₂O MW, 136

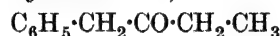
B.p. 189°, 78°/18 mm. D₁₀¹⁰ 0.9577, D₄²⁰ 0.9490. n_D²⁰ 1.4955. Volatile in steam. AcOH + H₂SO₄ → benzyl acetate. P₂O₅ in boiling C₆H₆ → diphenylmethane + ethylene.

Mettler, D.R.P., 116,181, (*Chem. Zentr.*, 1906, I, 615).

v. Braun, *Ber.*, 1910, **43**, 1351.

Senderens, *Compt. rend.*, 1924, **178**, 1412.

Ethyl benzyl Ketone (2-Keto-1-phenylbutane, 1-phenylbutanone-2)



C₁₀H₁₂O MW, 148

B.p. 225–6° (230°/755 mm.), 221–3°/737 mm., 111°/16 mm. D₄¹⁰ 1.002, D_{17.6}^{17.6} 0.998. CrO₃ → benzoic and propionic acids.

Semicarbazone : m.p. 135.5° (146°, 153°).

Ludlam, *J. Chem. Soc.*, 1902, **81**, 1189.

Senderens, *Ann. chim.*, 1913, **28**, 319.

Mailhe, *Compt. rend.*, 1913, **157**, 220.

Ethyl benzyl sulphide.

See under Benzyl Mercaptan.

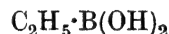
Ethylbiuret.

See under Biuret.

Ethyl borate.

See Triethyl borate.

Ethylboric Acid



C₂H₇O₂B MW, 74

White cryst. from Et₂O. Sublimes at 40°. Very volatile.

Mono-Et ester : cryst. Decomp. by H₂O.

Di-Et ester : C₄H₁₁O₂B. MW, 102. B.p. 125° decomp. Decomp. by H₂O. Combines with B(OEt)₃ → EtB(OEt)₂·B(OEt)₃, b.p. 112°.

Frankland, *Ann. chim.*, 1862, **124**, 142.

Khotinsky, Melamed, *Ber.*, 1909, **42**, 3095.

Ethyl bromide (Bromoethane)



C₂H₅Br MW, 109

Ethereal liq. F.p. –125.5° (–115.5°, –117.8°, –119°). B.p. 38.4°/760 mm. D₄¹⁰ 1.50138 (1.4973), D₁₅¹⁵ 1.4555 (1.45983, 1.4307). Solubility in 100 parts H₂O : at 0° 1.067, at 10° 0.965, at 20° 0.914, at 30° 0.896. Sol. EtOH, Et₂O, etc. n_D¹⁵ 1.4320, n_D¹⁵ 1.42756, n_D²⁰ 1.42386. Heat of comb. C₂ 329.5 (341.82) Cal., C_p 328.4 Cal. H₂O at 200° → diethyl ether + ethylene. H₂O at 100° → ethyl alcohol. Alc.

KOH \rightarrow ethylene. Cl \rightarrow 1-chloro-1-bromoethane + 2-chloro-1-bromoethane.

Weston, *J. Chem. Soc.*, 1915, **107**, 1489.

Holt, *J. Chem. Soc.*, 1916, **109**, 1.

Kamm, Marvel, *Organic Syntheses*, 1921, **I**, 6.

Ethyl bromophenyl Ketone.

See *p*-Bromopropiophenone.

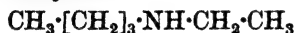
Ethyl- γ -butenylcarbinol.

See 1-Heptenol-5.

Ethyl γ -butenyl Ketone.

See 1-Heptenone-5.

Ethyl-*n*-butylamine



$\text{C}_6\text{H}_{15}\text{N}$ MW, 101

B.p. 108-9°.

$\text{B}_2\text{H}_6\text{PtCl}_6$: cryst. from H_2O . D_{15}^{25} 1.826.

Brill, *J. Am. Chem. Soc.*, 1932, **54**, 2486.

Le Bel, *Compt. rend.*, 1897, **125**, 351.

Ethyl-*sec*.-*n*-butylamine



$\text{C}_6\text{H}_{15}\text{N}$ MW, 101

dl-.

B.p. 97-8°/741 mm. D_0^{20} 0.7531, D_0^{20} 0.7358.

B, HCl : m.p. 118-20°.

B, HBr : m.p. 115-18°.

B, HI : m.p. 73-5°.

$\text{B}_2\text{H}_6\text{PtCl}_6$: m.p. 118-20°. Sol. H_2O , Et_2O .

B, HAuCl_4 : yellow hygroscopic cryst. M.p. 118-20°.

d-.

B.p. 98°. $[\alpha]_D^{25} = +18^\circ$. D_4^{25} 0.7396. n_D^{20} 1.40428.

Dioxalate: m.p. 155-6°.

Bewad, *J. prakt. Chem.*, 1901, **63**, 197.

Mamlock, Wolfenstein, *Ber.*, 1901, **34**, 2504.

Leithe, *Ber.*, 1930, **63**, 804.

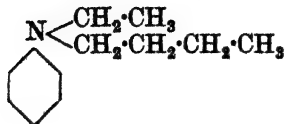
2-Ethyl-*n*-butylamine.

See 1-Amino-2-ethyl-*n*-butane.

Ethyl butylaminoformate.

See Butylurethane.

Ethyl-*n*-butylaniline



$\text{C}_{12}\text{H}_{19}\text{N}$ MW, 177

B.p. 237-42° (235-40°, 247°).

Picrate: yellow prisms from EtOH. M.p. 89-90°. Sol. hot EtOH, C_6H_6 .

Fröhlich, *Ber.*, 1909, **42**, 1562.

Komatsu, *Chem. Zentr.*, 1913, **I**, 799.

Ethylbutylbenzylamine

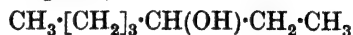


$\text{C}_{13}\text{H}_{21}\text{N}$ MW, 191

B.p. 238-40°.

Wedekind, Ney, *Ber.*, 1912, **45**, 1313.

Ethyl-*n*-butylcarbinol (*Heptanol*-3, 3-*hydroxy-n-heptane*)



$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

dl-.

B.p. 156.5-157°/750 mm.

Et ether: 3-ethoxy-*n*-heptane. $\text{C}_9\text{H}_{20}\text{O}$. MW, 144. B.p. 151°/750 mm.

d-.

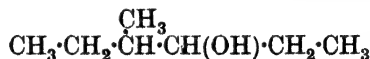
B.p. 66°/18 mm. D_4^{20} 0.8227. n_D^{20} 1.4206. $[\alpha]_D^{20} +6.68^\circ$.

Et-H-phthalic ester: needles from ligroin. M.p. 47-8°.

Blaise, Picard, *Ann. chim.*, 1912, **26**, 287.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1943-4.

Ethyl-*sec*.-butylcarbinol (3-*Methylhexanol*-4)

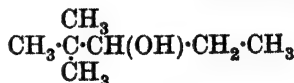


$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

B.p. 149-50°. D_0^{20} 0.8518.

Fourneau, Tiffeneau, *Compt. rend.*, 1907, **145**, 437.

Ethyl-*tert*.-butylcarbinol (2 : 2-Dimethylpentanol-3, 3-*hydroxy-2 : 2-dimethylpentane*)



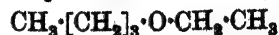
$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

Liq. with odour of camphor. B.p. 132-5°, 42-4°/15 mm. D_4^{20} 0.84078, D_4^{20} 0.82462.

Acetyl: b.p. 157-9°/770 mm.

Faworsky, *J. prakt. Chem.*, 1913, **88**, 676.

Ethyl *n*-butyl Ether



$\text{C}_6\text{H}_{14}\text{O}$ MW, 120

B.p. 92.3° (91°, 91.4°), 91.7°/742.7 mm. D_4^0 0.7694 (0.7680), D_4^{25} 0.7447, D_{20}^{20} 0.7522. n_D^{25} 1.3798.

Cherchez, *Bull. soc. chim.*, 1928, **43**, 767.
I.G., F.P., 710,846, (*Chem. Abstracts*, 1932, **26**, 1614).

Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2097.

Ethyl sec.-n-butyl Ether

$C_6H_{14}O$ $CH_3 \cdot CH_2 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot O \cdot CH_2 \cdot CH_3$ MW, 102

B.p. 81.2°. D_4^{25} 0.7377. n_D^{25} 1.3753.

See last reference above.

Ethyl tert.-butyl Ether

$C_6H_{14}O$ $CH_3 \cdot \overset{CH_3}{\underset{CH_3}{|C}} \cdot O \cdot CH_2 \cdot CH_3$ MW, 102

B.p. 73.1°/760 mm. (68–9°, 69–70°, 73°), 70°/758 mm. D_4^0 0.7681, D_{20}^{20} 0.7519, D_4^{25} 0.7364. n_D^{20} 1.3794, n_D^{25} 1.3728.

Reboul, *Jahresber. Fortschr. Chem.*, 1881, 409.

Nef, *Ann.*, 1900, **309**, 138.

Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2095.

Ethyl n-butyl Ketone (3-Ketoheptane, heptanone-3)

$C_7H_{14}O$ $CH_3 \cdot [CH_2]_3 \cdot CO \cdot CH_2 \cdot CH_3$ MW, 114

B.p. 149–50°, 147–8°/742.9 mm. Does not form bisulphite comp.

Semicarbazone : m.p. 99–100° (111°).

Ponzio, de Gaspari, *Gazz. chim. ital.*, 1898, **28**, 272.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1943.

Ethyl sec.-n-butyl Ketone (3-Keto-4-methylhexane, 3-methylhexanone-4)

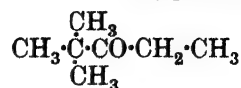
$C_7H_{14}O$ $CH_3 \cdot CH_2 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot CO \cdot CH_2 \cdot CH_3$ MW, 114

B.p. 134–5° (136–8°). D_4^{19} 0.8248. Does not form bisulphite comp.

Semicarbazone : m.p. 137°.

Hanriot, Bouveault, *Bull. soc. chim.*, 1889, **1**, 550.

Fourneau, Tiffeneau, *Compt. rend.*, 1907, **145**, 437.

Ethyl tert.-butyl Ketone (3-Keto-4:4-dimethylpentane, 2:2-dimethylpentanone-3)

$C_7H_{14}O$ MW, 114

Liq. with odour of camphor and mint. B.p. 125–6°. Sol. EtOH, Et₂O, etc. Mod. sol. H₂O. D_4^0 0.8303, D_4^{20} 0.8125, D_4^0 0.8258, D_{20}^{20} 0.8106. Does not form bisulphite comp. CrO₃ → acetic and trimethylacetic acids. Br → CH₃·CHBr·CO·C(CH₃)₃, b.p. 67–9°/11 mm.

Oxime : plates from EtOH. M.p. 79–80°.

Semicarbazone : m.p. 144°.

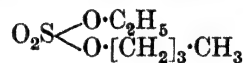
Wischnegradski, *Ann.*, 1875, **178**, 104.

Markownikow, *Ber.*, 1900, **33**, 1906.

Faworsky, *J. prakt. Chem.*, 1913, **88**, 676.

Ethylbutylmalonic Acid.

See Heptane-3 : 3-dicarboxylic Acid.

Ethyl butyl sulphate (Butyl sulphovinate)

$C_6H_{14}O_4S$ MW, 182

B.p. 117–18°/20 mm. D^{18} 1.112. n_D^{18} 1.415.

Bert, *Compt. rend.*, 1924, **178**, 1182.

Ethyl n-butyrate

$C_6H_{12}O_2$ $CH_3 \cdot CH_2 \cdot CH_2 \cdot CO \cdot OC_2H_5$ MW, 116

F.p. –93.3°. B.p. 119.9° (120–120.5°)/760 mm., 114.1°/752 mm., 66.8°/119.6 mm., 48.8°/50.2 mm. D_4^0 0.89970, D_4^{20} 0.87880, D_4^0 0.85760, $D_4^{19.5}$ 0.7704. $n_D^{17.95}$ 1.39302, n_D^{20} 1.40002.

Pelouze, Gélis, *Ann.*, 1843, **47**, 250.

2-Ethylbutyric Acid.

See 2-Methylvaleric Acid.

Ethylbutyrylcarbinol.

See 3-Heptanolone-4.

Ethyl cacodyl.

See Arsenic diethyl.

Ethyl cacodyl oxide

$(C_2H_5)_2As \cdot O \cdot As(C_2H_5)_2$ $C_8H_{20}OAs_2$ MW, 282

Liq. with disagreeable odour. B.p. 97–8°/10 mm. O → diethylcacodylic acid (diethylarsinic acid).

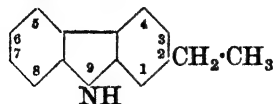
Wigren, *Ann.*, 1924, **437**, 285.

Ethylcarbamic Acid.

Et Ester, see Ethylurethane.

Amide, see Ethylurea.

2-Ethylcarbazole

 $C_{14}H_{13}N$

MW, 195

Prisms from AcOH. M.p. 225°.

Plant, Williams, *J. Chem. Soc.*, 1934, 1143.

3-Ethylcarbazole.

Prisms from toluene. M.p. 144°.

See above reference.

9-Ethylcarbazole (N-Ethylcarbazole).

Needles from EtOH. M.p. 67-8°. Sol. hot EtOH, Et₂O.

Picrate: crimson needles. M.p. 104-5° (97°). Sol. EtOH.

Graebe, Behaghel, *Ann.*, 1880, 202, 24.Atack, U.S.P., 1,494,879, (*Chem. Abstracts*, 1924, 18, 2173).Burton, Gibson, *J. Chem. Soc.*, 1924, 125, 2504.

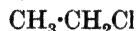
Ethyl carbonate.

See Diethyl carbonate, and Ethyl hydrogen carbonate.

Ethyl carbylamine.

See Ethyl isocyanide.

Ethyl chloride (Chloroethane)

 C_2H_5Cl

MW, 64.5

F.p. -142.5° (-141.6°, -138.7°). B.p. 12.5° (13.1°)/760 mm., 12.5-12.6°/725 mm. Spar. sol. H₂O. Sol. EtOH, Et₂O, etc. D₄²⁰ 0.9214, D₃²⁰ 0.92295, D₄²⁰ 0.91708. Heat of comb. C_p 334.11 (326.9) Cal., C_v 326.35 Cal. Crit. temp. 187.2°. Crit. press. 51.72 atm. Cl (cold) → mainly ethylidene chloride. Cl (hot, +SbCl₅) → ethylene dichloride. Br (hot, +Fe) → ethylbromide + ethylene dibromide. HI at 130° → ethyl iodide. NH₃ in EtOH → mono-, di-, and tri-ethylamines.

Groves, *Ann.*, 1874, 174, 372.Krüger, *J. prakt. Chem.*, 1876, 14, 195.Norris, Taylor, *J. Am. Chem. Soc.*, 1924, 46, 753.Dandl, U.S.Ps., 1,920,846, 1,920,246, (*Chem. Abstracts*, 1933, 27, 4818).

Ethyl chloroacetate (Chloroacetic ester)

 $C_4H_7O_2Cl$

MW, 122.5

F.p. -26°. B.p. 145-6°, 52°/20 mm. D₄²⁰ 1.1749, D₄²⁰ 1.1749, D₄²⁰ 1.1585 (1.1520), D₄¹⁴

0.9925. n_D^{20} 1.42274 (1.42162). Heat of comb. C_v 493.6 Cal. Decomp. on long boiling. NH₃ → chloroacetamide. NH₃ in EtOH → mainly glycine amide. KCN → ethyl cyanoacetate.

Conrad, *Ann.*, 1877, 188, 218.Imbert, D.R.Ps., 210,502, (*Chem. Zentr.*, 1909, II, 78), 212,592, (*Chem. Zentr.*, 1909, II, 1024).

Ethyl 1-chloroacetoacetate (α-Chloroacetoacetic ester)

 $C_6H_9O_3Cl$

MW, 164.5

B.p. 193° part decomp., 105-10°/30 mm. Sol. EtOH, Et₂O, etc. Spar. sol. H₂O. D_{17.5}¹⁴ 1.19. Hot dil. H₂SO₄ → chloroacetone. SO₂Cl₂ → ethyl 1:1-dichloroacetoacetate. NH₃ → 1-chloro-2-iminobutyric ester. KCN → 1-cyanoacetoacetic ester and 1-chloroacetoacetic ester cyanhydrin. Ph·NH·NH₂ → 4-benzeneazo-3-methyl-1-phenylpyrazolone-5. NH₂·CO·NH₂ → ethyl 5-methyliminazol-2-one-4-carboxylate. NH₂·CS·NH₂ → ethyl 2-amino-4-methylthiazole-5-carboxylate. Violet col. with FeCl₃. Forms Na, Cu, Mg and Ni derivs.

Schönbrodt, *Ann.*, 1889, 253, 171.Dey, *J. Chem. Soc.*, 1915, 107, 1646.

Ethyl 3-chloroacetoacetate (γ-Chloroacetoacetic ester)

 $C_6H_9O_3Cl$

MW, 164.5

B.p. 220° (210°) decomp., 115°/14 mm., 102°/12 mm. Turns yellow on standing. Prac. insol. H₂O. Sol. org. solvents. D₄²⁰ 1.2292, D₄¹⁷ 1.2176, D₄²⁰ 1.2157. n_D^{20} 1.4546. Dil. HCl → chloroacetone + EtOH + CO₂. NH₂·CS·NH₂ → ethyl 2-aminothiazole-4-acetate. Red col. with FeCl₃. Forms green Cu deriv., m.p. 168-9° decomp.

Alexandrow, *Ber.*, 1913, 46, 1022.Hamel, *Bull. soc. chim.*, 1921, 29, 396.

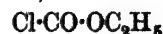
Ethyl chloroethyl Ether.

See Chlorodiethyl Ether.

Ethyl 2-chloroethyl sulphide.

See 2-Chlorodiethyl sulphide.

Ethyl chloroformate (Chloroformic ester, ethyl chlorocarbonate)

 $C_3H_5O_2Cl$

MW, 108.5

B.p. 94-5° (93.1°). D₄²⁰ 1.1596, D₄²⁰ 1.14419, D₄²⁰ 1.13519 (1.1377). n_D^{20} 1.39738 (1.39548).

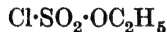
NaHg \longrightarrow formic acid. $\text{AlCl}_3 \longrightarrow$ ethyl chloride + CO_2 . $\text{NH}_3 \longrightarrow$ urethane. Dil. acids \longrightarrow HCl + CO_2 + ethylene. Reacts with many org. compounds giving carbethoxy derivs.

Rose, *Ann.*, 1880, **205**, 247.

Hochstetter, D.R.P., 282,134, (*Chem. Zentr.*, 1915, I, 464).

Cappelli, *Gazz. chim. ital.*, 1920, **50**, 8.

Ethyl chlorosulphonate (*Chlorosulphonic acid ethyl ester*)



$\text{C}_2\text{H}_5\text{O}_3\text{ClS}$ MW, 144.5

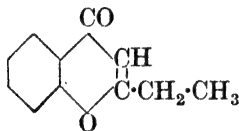
Fuming liq. B.p. 151–4° part. decomp., 93–5°/100 mm., 58°/20 mm., 52°/14 mm. D_4^{20} 1.379, D_4^{18} 1.263. Sol. Et_2O , CHCl_3 , ligroin. Decomp. at boil to H_2SO_4 , HCl , SO_2 and ethylene. Decomp. by H_2O and EtOH .

Behrend, *J. prakt. Chem.*, 1877, **15**, 28.

Bushong, *Am. Chem. J.*, 1903, **30**, 214.

Willcox, *Am. Chem. J.*, 1904, **32**, 450.

2-Ethylchromone



$\text{C}_{11}\text{H}_{10}\text{O}_2$ MW, 174

Needles from Et_2O -pet. ether. M.p. 18°. $\text{NaOH.Aq.} \longrightarrow$ salicylic acid.

Heilbron, Hey, Lowe, *J. Chem. Soc.*, 1934, 1312.

Ethyl cinnamate



$\text{C}_{11}\text{H}_{12}\text{O}_2$ MW, 176

Trans :

Occurs in storax. F.p. 12° (6.5°). B.p. 271°, 158.5–159°/24 mm., 144°/15 mm. $D_4^{15.4}$ 1.0566, $D_4^{16.8}$ 1.0519, D_4^{20} 1.0490, D_4^{25} 1.0469 (1.0457), D_4^{30} 1.0234, D_4^{35} 1.0018. $n_D^{12.5}$ 1.56351, $n_D^{18.8}$ 1.561, n_D^{20} 1.55982. $\text{H} \longrightarrow$ ethyl 2-phenylpropionate. $\text{Br} \longrightarrow$ ethyl 2-phenyl-1 : 2-dibromopropionate.

Cis : (Ethyl allo-cinnamate).

B.p. 125°/12 mm. $D_4^{15.4}$ 1.0569, D_4^{20} 1.049. $n_D^{15.4}$ 1.54833, n_D^{20} 1.545.

Trans :

Fischer, Speier, *Ber.*, 1895, **28**, 3254.

Marvel, King, *Organic Syntheses*, 1929, IX, 38.

Cis :

Auwers, Schmellenkamp, *Ber.*, 1921, **54**, 631.

α -Ethylcinnamic Acid (1-Benzylidenebutyric acid)



$\text{C}_{11}\text{H}_{12}\text{O}_2$ MW, 176

Trans :

M.p. 104° (106°). Sol. EtOH , hot ligroin. Spar. sol. cold ligroin.

Me ester : $\text{C}_{12}\text{H}_{14}\text{O}_2$ MW, 190. B.p. 250–60°.

Et ester : $\text{C}_{13}\text{H}_{16}\text{O}_2$ MW, 204. B.p. 142–3°/12 mm.

Chloride : $\text{C}_{11}\text{H}_{11}\text{OCl}$ MW, 194.5. B.p. 142°/14 mm.

Amide : $\text{C}_{11}\text{H}_{13}\text{ON}$ MW, 175. Prisms from EtOH . M.p. 128°.

Cis : (1-Ethylallocinnamic acid).

Liq.

Aniline salt : m.p. 81°.

Trans :

Perkin, *J. Chem. Soc.*, 1877, **31**, 393.

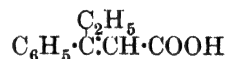
Fittig, Slocum, *Ann.*, 1885, **227**, 53.

Michael, *Ber.*, 1901, **34**, 928.

Cis :

Stoermer, Voht, *Ann.*, 1915, **409**, 57.

β -Ethylcinnamic Acid



$\text{C}_{11}\text{H}_{12}\text{O}_2$ MW, 176

Trans :

M.p. 95–5°.

Me ester : b.p. 130°/8 mm.

Amide : m.p. 104°.

Anilide : m.p. 84°.

Cis : (2-Ethylallocinnamic acid).

M.p. 93–95.5°.

Me ester : b.p. 122–3°/8 mm.

Amide : m.p. 101°.

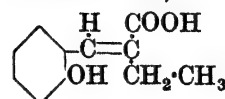
Anilide : m.p. 122°.

Stoermer, Grimm, Laage, *Ber.*, 1917, **50**, 959.

Ethylcitraconic Acid.

See Propylmaleic Acid.

α -Ethyl-o-coumaric Acid (α -Ethyl-o-hydroxy-trans-cinnamic acid)



$\text{C}_{11}\text{H}_{10}\text{O}_3$ MW, 192

Prisms from EtOH.Aq. Needles from H_2O or C_6H_6 . M.p. 181° decomp. (174°). Sol. EtOH , Et_2O . Spar. sol. H_2O , CHCl_3 . Gives no col. with FeCl_3 .

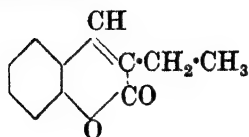
Me ether : $\text{C}_{12}\text{H}_{14}\text{O}_3$ MW, 206. Needles

from EtOH. M.p. 105°. *Me ester*: $C_{13}H_{16}O_3$. MW, 220. B.p. 292°. D_{15}^{25} 1.1100.

Perkin, *J. Chem. Soc.*, 1877, 31, 416; 1881, 39, 438.

Fries, Volk, *Ann.*, 1911, 379, 99.

3-Ethylcoumarin



$C_{11}H_{10}O_2$ MW, 174

Prisms. M.p. 70–1°. B.p. 299° slight decomp. Sol. hot EtOH, Et_2O . Spar. sol. hot H_2O . $KOH \rightarrow$ salicylic acid. $P_2S_5 \rightarrow$ 3-ethyl-2-thiocoumarin.

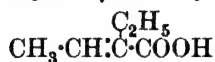
Oxime: needles. M.p. 157°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. hot H_2O .

Phenylhydrazone: yellow needles. M.p. 115°. Sol. EtOH, Et_2O , C_6H_6 .

Perkin, *J. Chem. Soc.*, 1868, 21, 56.

Fittig, Brown, *Ann.*, 1889, 255, 288.

1-Ethylcrotonic Acid (2-Methyl-1-ethylacrylic acid, β -amylene- γ -carboxylic acid)



$C_6H_{10}O_2$ MW, 114

(I) Solid form.

M.p. 41–2° (45°). B.p. 209°, 109°/13 mm. D_4^{25} 0.9484. Spar. sol. H_2O . Sol. EtOH, Et_2O , etc. $KMnO_4 \rightarrow$ 1:2-dihydroxy-1-ethylbutyric acid. Fusion with $KOH \rightarrow$ acetic and butyric acids. $Br \rightarrow$ 2:3-dibromopentane-3-carboxylic acid. $HBr \rightarrow$ 2-bromo-1-ethylbutyric acid.

Et ester: $C_8H_{14}O_2$. MW, 142. B.p. 165° (167°).

Chloride: C_6H_9OCl . MW, 132.5. B.p. 54°/13 mm.

Amide: $C_6H_{11}ON$. MW, 113. M.p. 114–15°.

(II) Liquid form.

F.p. –35°. B.p. 199.5°/750 mm., 107–8°/10 mm. Insol. H_2O . Sol. EtOH, Et_2O , etc. D_4^{25} 0.9805, D_4^{20} 0.976. $PCl_3 \rightarrow$ chloride of solid ethylcrotonic acid. $KMnO_4 \rightarrow$ 1:2-dihydroxy-1-ethylbutyric acid. $Br \rightarrow$ 2:3-dibromopentane-3-carboxylic acid.

Et ester: b.p. 158–9°, 52°/9 mm.

Fittig, *Ann.*, 1904, 334, 102, 115.

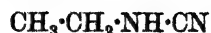
Auwers, *Ann.*, 1933, 432, 76.

Blaise, Bagard, *Ann. chim. phys.*, 1907, 11, 127.

2-Ethylcrotonic Acid.

See 2-Methyl-2-ethylacrylic Acid.

Ethylcyanamide



$C_3H_6N_2$

MW, 70

Neutral syrup. Polymerises. $H_2S \rightarrow$ ethylthiourea. $H_2Se \rightarrow$ ethylselenourea.

McKee, *Am. Chem. J.*, 1906, 36, 212.

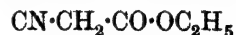
Cahours, Clöez, *Ann.*, 1854, 90, 95.

Schmidt, *Ber.*, 1921, 54, 2068.

Ethyl cyanide.

See under Propionic Acid.

Ethyl cyanoacetate (Cyanoacetic ester)



$C_5H_7O_2N$

MW, 113

B.p. 207°, 122°/42 mm., 107°/27 mm., 97°/16 mm. Insol. H_2O . Sol. NH_3 , Aq. D_4^{25} 1.063, D_4^{25} 1.0560 (1.0562), D_4^{20} 1.0306, D_4^{15} 1.0052. n_D^{20} 1.41793. Heat of comb. C_p 557.2 Cal., C_p 629.7 Cal. $Br \rightarrow$ bromocyanoacetic ester. $NH_3 \rightarrow$ cyanoacetamide. $HNO_2 \rightarrow$ oximinocyanoacetic ester. $NH_2 \cdot NH_2$ in EtOH \rightarrow cyanoacetylhydrazide. EtOH (+ conc. H_2SO_4) \rightarrow ethyl malonate. Gives Na deriv. CH_3COCl and $C_6H_5COCl \rightarrow$ acetyl and benzoyl cyanoacetic esters.

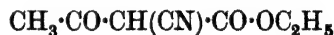
Noyes, *J. Am. Chem. Soc.*, 1904, 26, 1545.

Kohler, Allen, *Organic Syntheses*, 1923, III, 53.

Stephens, *J. Soc. Chem. Ind.*, 1924, 43, 313r, 327r.

Inglis, *Organic Syntheses*, 1928, VIII, 74.

Ethyl 1-cyanoacetoacetate (1-Cyanoacetoacetic ester)



$C_7H_9O_3N$

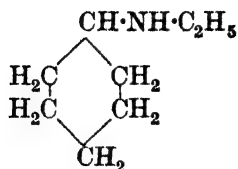
MW, 155

Needles. M.p. 23° (26°). B.p. 195–7°, 130–2°/35 mm., 112–14°/18 mm., 104°/10 mm. Decomp. slowly on standing. Spar. sol. H_2O . Sol. EtOH, Et_2O , $CHCl_3$, CS_2 , C_6H_6 . D_4^{25} 1.1107. n_D^{20} 1.4710. Heat of comb. C_p 836.8 Cal., C_p 837.0 Cal. Aq. sol. reacts acid. Gives bright red. col. with $FeCl_3$. KOH in EtOH \rightarrow ammonia, acetic acid, ethyl alcohol, and CO_2 . $NH_3 \rightarrow$ ethyl 2-imino-1-cyanobutyrate. Forms Na, K, NH_4 , Cu, Ca, Ba, Mg, Ag, and Pb derivs.

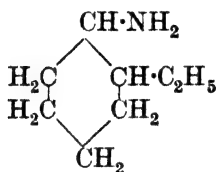
Semicarbazone: m.p. 190°.

Haller, Held, *Ann. chim. phys.*, 1889, 17, 204.

Michael, Eckstein, *Ber.*, 1905, 38, 51.

N-Ethylcyclohexylamine (*Hexahydroethyl-aniline*) $\text{C}_8\text{H}_{17}\text{N}$

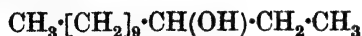
MW, 127

Liq. with fishy odour. B.p. 164° . D_4^{20} 0.868.B.HCl: m.p. 184° .N-Acetyl: b.p. $256^\circ/740$ mm.N-Benzoyl: b.p. 201° .N-Nitroso: b.p. $130^\circ/12$ mm.Picrate: yellow cryst. from EtOH. M.p. 133° .Skita, Rolfes, *Ber.*, 1920, **53**, 1251.Sabatier, Mailhe, *Compt. rend.*, 1911, **153**, 1207.I.G., E.P., 334,579, (*Chem. Abstracts*, 1931, **25**, 964).**2-Ethylcyclohexylamine** (*Hexahydro-o-aminoethylbenzene*) $\text{C}_8\text{H}_{17}\text{N}$

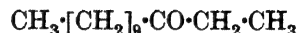
MW, 127

B.p. $170-1^\circ$, $53^\circ/12$ mm. D_4^{20} 0.8744. n_D^{20} 1.4682.N-Benzenesulphonyl: m.p. $121-2^\circ$.Chloroplatinate: m.p. $238-9^\circ$.Picrate: m.p. $189-90^\circ$.Willstätter, Seitz, v. Braun, *Ber.*, 1925, **58**, 385.**Ethylcyclohexyl Ketone.**

See Hexahydropropiophenone.

Ethyl-n-decylcarbinol (*Tridecanol-3, 3-hydroxytridecane*) $\text{C}_{13}\text{H}_{28}\text{O}$

MW, 200

*d.*Needles from EtOH. M.p. 32° . B.p. $139^\circ/12$ mm. D_4^{20} 0.8139. $[\alpha]_D^{20} + 12.44^\circ$. Volatile in steam.Acid phthalate: m.p. $35-35.5^\circ$. $[\alpha]_D^{20} + 17.58^\circ$ in EtOH.*l.*Needles from EtOH. M.p. 32° . B.p. $140^\circ/15$ mm. D_4^{20} 0.8180. $[\alpha]_D^{20} - 6.73^\circ$ in EtOH.Acid phthalate: m.p. $35-35.5^\circ$. $[\alpha]_D^{20} - 17.71^\circ$ in EtOH.*dl.*Plates. M.p. 14.5° . B.p. $148^\circ/20$ mm.Acid phthalate: m.p. $46-7^\circ$.Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1948.**Ethyl n-decyl Ketone** (*Tridecanone-3, 3-ketotridecane*) $\text{C}_{13}\text{H}_{26}\text{O}$

MW, 198

Plates. M.p. 25° . B.p. $140^\circ/17$ mm.Semicarbazone: cryst. from EtOH.Aq. M.p. 90° .

See above reference.

 α -Ethylidibenzyl.See 1:2-Diphenyl-*n*-butane.**Ethylidibenzylamine** $\text{C}_{16}\text{H}_{19}\text{N}$

HW, 225

B.p. 306° . Sol. EtOH, Et₂O. Insol. H₂O.Limpricht, *Ann.*, 1867, **144**, 315.Kraft, *Ber.*, 1890, **23**, 2782.**Ethylidibromoarsine** (*Dibromoethylarsine, ethylarsenic dibromide, ethylarsine-dibromide*) $\text{C}_2\text{H}_5\text{Br}_2\text{As}$

MW, 264

B.p. 192° .Dehn, *Am. Chem. J.*, 1908, **40**, 108.**Ethylidichloroamine.**See *N*-Dichloroethylamine.**Ethylidichloroarsine** (*Dichloro-ethylarsine, ethylarsine dichloride*) $\text{C}_2\text{H}_5\text{Cl}_2\text{As}$

MW, 175

B.p. 156° (155.3°), $131.2^\circ/400$ mm., $109.6^\circ/200$ mm., $90^\circ/100$ mm., $74^\circ/50$ mm. D_4^{20} 1.6595. Sol. H₂O. Misc. with EtOH, Et₂O, C₆H₆, etc. Dil. HNO₃ \rightarrow ethylarsinic acid.La Coste, *Ann.*, 1881, **208**, 33.Dehn, *Am. Chem. J.*, 1908, **40**, 110.Gibson, Johnson, *J. Chem. Soc.*, 1931, 2518.**Ethyl 1:2-dichlorovinyl Ether** (*1:2-Dichloro-1-ethoxyethylene*) $\text{C}_4\text{H}_6\text{OCl}_2$

MW, 141

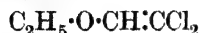
B.p. 128.2° . D^{10} 1.08. H₂O \rightarrow ethyl chloro-

acetate. H_2O at $180^\circ \longrightarrow \text{HCl} + \text{ethylchloride} + \text{glycollic acid}$.

Geuther, Brockhoff, *J. prakt. Chem.*, 1873, 7, 112.

Imbert, D.R.P., 216,940, (*Chem. Zentr.*, 1910, I, 308).

Ethyl 2 : 2-dichlorovinyl Ether (2 : 2-Dichloro-1-ethoxyethylene)



$\text{C}_4\text{H}_6\text{OCl}_2$ MW, 141

B.p. $144.2^\circ/765.3$ mm. D^{20}_D 1.2081. $\text{O} \longrightarrow \text{ethoxychloroacetyl chloride} + \text{phosgene} + \text{ethyl formate}$. H_2SO_4 at $130-40^\circ \longrightarrow \text{dichloroacetaldehyde} + \text{ethylene}$.

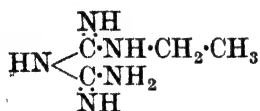
Godefroy, *Jahresber. Fortschr. Chem.*, 1886, 1174.

Neher, Foster, *J. Am. Chem. Soc.*, 1909, 31, 415.

Ethyl diethoxypropionate.

See under Formylacetic Acid.

Ethyldiguanide



$\text{C}_4\text{H}_{11}\text{N}_5$ MW, 129

Deliquescent cryst. Sol. EtOH. Insol. Et₂O. Heat $\longrightarrow \text{NH}_3 + \text{ethylamine}$.

B, HCl : sol. H_2O , EtOH. Insol. Et₂O.

$B_2, \text{H}_2\text{SO}_4, 1\frac{1}{2}\text{H}_2\text{O}$: m.p. 180° (anhyd.). Sol. H_2O . Insol. Et₂O, EtOH. Loses H_2O at 100° .

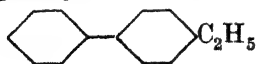
Smolka, Friedreich, *Monatsh.*, 1888, 9, 229.

Emich, *Monatsh.*, 1883, 4, 396.

Ethyl 2-dimethylaminoethyl Ether.

See 2-Dimethylaminodiethyl Ether.

4-Ethyldiphenyl



$\text{C}_{14}\text{H}_{14}$ MW, 182

Plates. M.p. $46-7^\circ$. B.p. $283-4^\circ/763$ mm., $140^\circ/15$ mm. D^0 1.043. $\text{CrO}_3 \longrightarrow p\text{-phenylbenzoic acid}$.

Adam, *Ann. chim. phys.*, 1888, 15, 249.

Ferriss, Turner, *J. Chem. Soc.*, 1920, 1142.

Auwers, Jülicher, *Ber.*, 1922, 55, 2182.

N-Ethyldiphenylamine



$\text{C}_{14}\text{H}_{15}\text{N}$

MW, 197

B.p. $295-7^\circ$ ($285-7^\circ$).

Girard, *Bull. soc. chim.*, 1875, 23, 3.

Tippmann, Fleissner, *Monatsh.*, 1883, 4, 797.

Ethyldiphenylcarbinol.

See 1-Hydroxy-1 : 1-diphenylpropane.

α -Ethyldiphenylmethane.

See 1 : 1-Diphenylpropane.

Ethyldipicrylamine.

See under 2 : 4 : 6 : 2' : 4' : 6'-Hexanitrodi-phenylamine.

Ethyldipropylamine



$\text{C}_8\text{H}_{19}\text{N}$ MW, 129

B.p. $137.2^\circ/749.9$ mm. ($132-4^\circ$). Sol. most org. solvents except EtOH. Spar. sol. H_2O . D^{24}_D 0.807.

B, HCl : needles. M.p. $113-15^\circ$.

$B_2, \text{H}_2\text{PtCl}_6$: orange-yellow cryst. M.p. 175° . Sol. H_2O . Insol. EtOH.

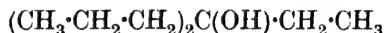
B, HAuCl_4 : m.p. 96° . Sol. H_2O .

Comanducci, Arena, *Chem. Zentr.*, 1907, II, 1396.

Passon, *Ber.*, 1891, 24, 1680.

v. Braun, *Ber.*, 1900, 33, 1446.

Ethyldipropylcarbinol (4-Ethylheptanol-4, 3-propylhexanol-3)



$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

B.p. 179.5° . D^{20}_D 0.83492, D^{30}_D 0.82827. Heat of comb. C_p 1401.8 Cal. $\text{CrO}_3 \longrightarrow \text{CO}_2$, acetic, propionic and butyric acids, and butyrone.

Tschebotarew, Saizew, *J. prakt. Chem.*, 1886, 33, 198.

Halse, *J. prakt. Chem.*, 1914, 89, 456.

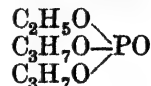
Ethyldipropylmethane.

See 4-Ethylheptane.

Ethyldipropylphenylmethane.

See 4-Ethyl-4-phenylheptane.

Ethyl dipropyl phosphate



$\text{C}_8\text{H}_{19}\text{O}_4\text{P}$ MW, 210

B.p. $145^\circ/20$ mm. D^0 1.046, D^{25}_D 1.025. Sol. 45 parts H_2O at 25° . $\text{H}_2\text{O} \longrightarrow \text{dipropyl phosphate} + \text{ethyl propyl phosphate}$.

Drushel, *Chem. Zentr.*, 1916, I, 1224.

ω -Ethyldipropyltoluene.

See 4-Ethyl-4-phenylheptane.

Ethyldodecylcarbinol (*Pentadecanol-3, 3-hydroxypentadecane*)



$\text{C}_{15}\text{H}_{32}\text{O}$ MW, 228

l.

Needles from EtOH. M.p. 45°. B.p. 168°/14 mm. D_4^{25} 0.8115. $[\alpha]_D^{20}$ -5.46° in EtOH. Non-volatile in steam.

Acid phthalate: cryst. from pet. ether. M.p. 46-7°. $[\alpha]_D^{20}$ -16.98° in EtOH.

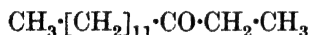
dl.

M.p. 32°. B.p. 163°/12 mm.

Acid phthalate: cryst. from pet. ether. M.p. 54-5°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1951.

Ethyl dodecyl Ketone (*Pentadecanone-3, 3-ketopentadecane*)



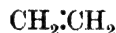
$\text{C}_{15}\text{H}_{30}\text{O}$ MW, 226

Plates. M.p. 38°. B.p. 174°/20 mm. Spar. volatile in steam.

Semicarbazone: cryst. from EtOH.Aq. M.p. 90-5°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936, 1952.

Ethylene



C_2H_4 MW, 28

F.p. -169°. B.p. -105° (-102.3°, -103.9°). Coefficient of absorption in H_2O : 0.226 at 0°, 0.162 at 10°, 0.122 at 20°, 0.098 at 30°. Heat of comb. C_p 333.35 (341.1, 345.8) Cal. Crit. temp. 9.5°. Crit. press. 50.65 atm. Burns with luminous flame. $\text{H} \rightarrow$ ethane. $\text{H}_2\text{SO}_4 \rightarrow$ ethyl hydrogen sulphate. $\text{Cl} \rightarrow$ ethylene dichloride, $\text{Br} \rightarrow$ ethylene dibromide. $\text{I} \rightarrow$ ethylene di-iodide. $\text{HBr} \rightarrow$ ethyl bromide. $\text{HI} \rightarrow$ ethyl iodide. $\text{O}_3 \rightarrow$ ethylene ozonide. $\text{N}_2\text{O}_4 \rightarrow$ ethylene nitrosate. $\text{HOCl} \rightarrow$ ethylene chlorohydrin. $\text{HOBr} \rightarrow$ ethylene bromohydrin.

Erlenmeyer, Bunte, *Ann.*, 1878, 192, 244.

Newth, *J. Chem. Soc.*, 1901, 79, 915.

Senderens, *Bull. soc. chim.*, 1911, 9, 371.

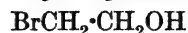
Kesting, *Z. angew. Chem.*, 1925, 38, 362.

Ssakmin, *Ber.*, 1934, 67, 392.

Ethyleneacetic Acid.

See Cyclopropane-carboxylic Acid.

Ethylene bromohydrin (*2-Bromoethyl alcohol, 2-bromo-1-hydroxyethane*)



$\text{C}_2\text{H}_5\text{OBr}$ MW, 125

B.p. 149-50°/750 mm., 63-4°/18 mm. D_4^{25} 1.7902. D^{17} 1.685. Misc. with most org. solvents. Forms azeotropic mixture with H_2O , b.p. 99.1°/762.4 mm. Hot $\text{H}_2\text{O} \rightarrow$ ethylene glycol.

Et ether: see 2-Bromodiethyl Ether.

Mokijewski, *Chem. Zentr.*, 1899, I, 591.

McDowall, *J. Chem. Soc.*, 1926, 499.

Thayer, Marvel, Hiers, *Organic Syntheses*, 1926, VI, 12.

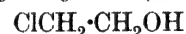
Ethylene bromoiodide.

See 2-Bromo-1-iodoethane.

Ethylene chlorobromide.

See sym.-Chlorobromoethane.

Ethylene chlorohydrin (*2-Chloroethyl alcohol, 2-chloro-1-hydroxyethane*)



$\text{C}_2\text{H}_5\text{OCl}$ MW, 80.5

F.p. -67.5°. B.p. 128.6° (129.5°), 51-2°/22 mm., 44°/20 mm. D_4^{20} 1.2195, D_4^{25} 1.1988, D^{15} 1.2072, D^{30} 1.2019. n_D^{15} 1.44380, n_D^{20} 1.44189. Misc. with H_2O and most org. solvents. Forms azeotropic mixture with H_2O , b.p. 95-8°/735 mm. $\text{KOH} \rightarrow$ ethylene oxide. $\text{NaHg} + \text{H}_2\text{O} \rightarrow$ ethyl alcohol. $\text{CrO}_3 \rightarrow$ chloroacetic acid. $\text{Na}_2\text{S} \rightarrow$ thiodiglycol.

Me ether: see Methyl 2-chloroethyl Ether.

Et ether: see 2-Chlorodiethyl Ether.

Gomberg, *J. Am. Chem. Soc.*, 1919, 41, 1414.

Shilov, *Journal of Chemical Industry (Moscow)*, 1928, 5, 1273.

Zapadinskü, *ibid.*, 1426.

Long, Willson, Wheeler, E.P., 265, 259, (*Chem. Abstracts*, 1928, 22, 244).

Frahm, *Rec. trav. chim.*, 1931, 50, 261.

Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, E.P. Application, 19215/1932.

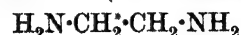
Ethylene chloroiodide.

See 1-Chloro-2-iodoethane.

Ethylene cyanhydrin.

See under Hydracrylic Acid.

Ethylenediamine (*1 : 2-Diaminoethane*)



$\text{C}_2\text{H}_8\text{N}_2$ MW, 60

M.p. 8.5°. B.p. 116.5°. Ammoniacal odour. Sol. H_2O with hydration. Insol. C_6H_6 , Et_2O . D^{15} 0.902, D_4^{25} 0.898, D_4^{25} 0.8919. n_D^{25} 1.45400.

$k = 8.5 \times 10^{-5}$ at 25° . Volatile in steam. Forms compounds with metallic salts.

B_2H_2O : m.p. 10° . B.p. 118° . $D_4^{20.5}$ 0.9634. $n_D^{20.5}$ 1.44997.

B_2HCl : monoclinic prisms. Insol. EtOH. Sublimes without melting.

NN-Diacetyl: needles. M.p. 172° . Very sol. H_2O , EtOH. Spar. sol. Et_2O .

Isovaleryl: hypotonin. M.p. $129-30^\circ$.

NN-Dibenzoyl: m.p. 244° .

NN-Di-benzenesulphonyl: m.p. 168° .

Di-picrate: m.p. $233-5^\circ$ decomp.

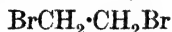
Bailar, *J. Am. Chem. Soc.*, 1934, **56**, 955.

Kraut, *Ann.*, 1882, **212**, 251.

Ing, Manske, *J. Chem. Soc.*, 1926, 2348.

Putokhin, *Transactions of the Institute of Pure Chemical Reagents*, U.S.S.R., 1929, No. 300, 119.

Ethylene dibromide (sym.-Dibromoethane)



$C_2H_4Br_2$ MW, 188

M.p. 10° . B.p. 131.7° , $52.1^\circ/50.8$ mm., $34^\circ/14$ mm. D_4^{20} 2.21324, D_4^{20} 2.1785, D_4^{25} 2.1620. n_D^{20} 1.54160, n_D^{20} 1.53789. Hot $H_2O \rightarrow$ ethylene glycol. KOH \rightarrow vinyl bromide. KOH in EtOH \rightarrow vinyl bromide + acetylene. $NH_3 \rightarrow$ ethylenediamine and diethylenediamine. K_2S in EtOH \rightarrow diethylene disulphide.

Erlenmeyer, Bunte, *Ann.*, 1873, **168**, 64.

Bauer, U.S.P., 1,414,852, (*Chem. Abstracts*, 1922, **16**, 2150).

Kesting, *Z. angew. Chem.*, 1925, **38**, 362.

Ethylene-dicarboxylic Acid.

See Fumaric Acid, Maleic Acid, and Methylenemalononic Acid.

Ethylene dichloride (sym.-Dichloroethane)



$C_2H_4Cl_2$ MW, 99

F.p. -42.0° (-36°). B.p. 83.7° (83.5°). 100 gm. H_2O dissolve 0.922 gm. at 0° , 0.885 gm. at 10° , 0.869 gm. at 20° , 0.865 gm. at 25° , 0.894 gm. at 30° . D_4^1 1.28034 (1.28238, 1.28082), D_4^{20} 1.2521 (1.2501, 1.2569), D_4^{25} 1.1576. n_D^{15} 1.44759, n_D^{20} 1.44432 (1.44439). Heat of comb. C_p 296.36 Cal. KOH in EtOH \rightarrow vinyl chloride. $NH_3 \rightarrow$ ethylenediamine and diethylenediamine. $AlCl_3 \rightarrow$ acetylene. Aniline \rightarrow diphenylpiperazine.

Limpricht, *Ann.*, 1855, **94**, 245.

Bahr, Zieler, *Z. angew. Chem.*, 1930, **43**, 233.

Gersdorff, *U.S. Dept. Agriculture, Miscellaneous Publications*, 1932, **117**, 3 (Bibl.).

Ethylene dicyanide.

See under Succinic Acid.

Ethylenediethyldiamine.

See sym.-Diethylethylenediamine.

Ethylene di-iodide (sym.-Di-iodoethane)



$C_2H_4I_2$ MW, 282

Prisms or plates. M.p. $81-2^\circ$. Decomp. in the light. D^{10} 2.132. Heat of comb. C_p 324.3 Cal., C_p 324.9 Cal. Br \rightarrow ethylene dibromide. EtOH at $70^\circ \rightarrow$ 2-iododiethyl ether. $HgCl_2 \rightarrow$ 2-chloro-1-iodoethane and ethylene dichloride. $AgNO_2 \rightarrow$ 1:2-dinitroethane and 2-nitroethyl nitrite.

Semenoff, *Jahresber. Fortschr. Chem.*, 1864, 483.

Ethylenedimethyldiamine.

See sym.-Dimethylethylenediamine.

Ethylenedi- β -naphthyldiamine.

See sym.-Di-2-naphthylethylenediamine.

Ethylenediphenyldiamine.

See sym.-Diphenylethylenediamine.

Ethylene Dithioglycol (Dimercaptoethane, dithioethylene glycol)



$C_2H_6S_2$ MW, 94

B.p. 146° . D^{24} 1.123. Sol. EtOH, alkalis. $HNO_3 \rightarrow$ ethane-disulphonic acid. Br in $CHCl_3$ or $H_2SO_4 \rightarrow$ diethylene tetrasulphide.

Di-Me ether: $C_4H_{10}S_2$. MW, 122. B.p. 183° .

Mono-Et ether: $C_4H_{10}S_2$. MW, 122. B.p. 188° .

Di-Et ether: $C_6H_{14}S_2$. MW, 150. B.p. $210-13^\circ$.

Meyer, *Ber.*, 1886, **19**, 3263.

Fasbender, *Ber.*, 1887, **20**, 461.

Ethyleneditolyldiamine.

See sym.-Ditolylethylenediamine.

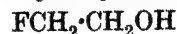
Ethylene fluorobromide.

See sym.-Fluorobromoethane.

Ethylene fluorochloride.

See sym.-Fluorochloroethane.

Ethylene fluorohydrin (2-Fluoroethyl alcohol, 2-fluoro-1-hydroxyethane)



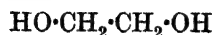
C_2H_5OF MW, 64

F.p. -26.45° . B.p. $103.35^\circ/757$ mm. $D^{18.3}$ 1.11124, D^0 1.1297. $n_D^{18.4}$ 1.36470. Sol. H_2O . Dissolves $CaCl_2$ and $Ca(NO_3)_2$.

Acetyl: fluoroethyl acetate. $C_4H_7O_2F$. MW, 106. B.p. $119.3^\circ/753$ mm., $45.5^\circ/27$ mm. D^{20} 1.0982. n_D^{20} 1.37792.

Swarts, *Rec. trav. chim.*, 1914, **33**, 258, (*Chem. Abstracts*, 1915, **9**, 3227).

Ethylene Glycol (sym. - *Dihydroxyethane*, glycol)



$\text{C}_2\text{H}_6\text{O}_2$ MW, 62

Odourless, viscous liq. with sweet taste. M.p. -11.5° (-15.6°). B.p. 197° , $140.8^\circ/101$ mm., $136.7^\circ/83$ mm., $122.5^\circ/44$ mm., $109^\circ/25$ mm., $93^\circ/13$ mm. D_4^{20} 1.1088. n_D^{20} 1.43178 Misc. in all proportions with H_2O , EtOH, MeOH, amyl alcohol, Me_2CO , glycerol, AcOH, Py. Not misc. with CHCl_3 , CCl_4 , Et_2O , C_6H_6 , CS_2 . Heat of comb. C_p 282.2 Cal. Heat of form. C_p -111.1 Cal.

Mono-acetyl: b.p. $187-9^\circ$.

Diacetyl: b.p. $186-7^\circ$. D_4^0 1.128.

Mono-p-nitrobenzoyl: m.p. $77-8^\circ$.

Mono-Me ether: see Methyl 2-hydroxyethyl Ether.

Di-Me ether: 1:2-dimethoxyethane. $\text{C}_4\text{H}_{10}\text{O}_2$. MW, 90. M.p. -58° . B.p. $82-3^\circ$, $78^\circ/750$ mm. D_4^{15} 0.86877, D_4^{20} 0.86285. n_D^{20} 1.37216.

Mono-Et ether: see 2-Hydroxydiethyl Ether.

Di-Et ether: 1:2-diethoxyethane. $\text{C}_6\text{H}_{14}\text{O}_2$. MW, 118. B.p. $123.5^\circ/758.5$ mm. D_4^0 0.8628 (0.7993), D_4^{20} 0.8484.

Propyl ether: see 2-Hydroxyethyl propyl Ether.

Isopropyl ether: see 2-Hydroxyethyl isopropyl Ether.

Butyl ether: see 2-Hydroxyethyl butyl Ether.

Isobutyl ether: see 2-Hydroxyethyl isobutyl Ether.

Amyl ether: see 2-Hydroxyethyl amyl Ether.

Mono-allyl ether: 2-hydroxyethyl allyl ether. $\text{C}_5\text{H}_{10}\text{O}_2$. MW, 102. B.p. $158.8-159^\circ/755.4$ mm. D_4^{15} 0.96095.

Ethylene ether: see 1:4-Dioxan.

Phenyl ether: see 2-Hydroxyethyl phenyl Ether.

Chlorophenyl ether: see 2-Hydroxyethyl chlorophenyl Ether.

Diphenyl ether: sym.-diphenoxyethane. $\text{C}_{14}\text{H}_{14}\text{O}_2$. MW, 214. Leaflets from EtOH. M.p. 98° . Sol. Et_2O , CHCl_3 , hot EtOH. Insol. H_2O .

Di-p-aminophenyl ether: pp'-diaminodiphenoxyethane. $\text{C}_{14}\text{H}_{16}\text{O}_2\text{N}_2$. MW, 244. Needles from EtOH. M.p. 176° . $\text{FeCl}_3 \rightarrow$ cherry-red col. Sol. $\text{H}_2\text{SO}_4 \rightarrow$ blue col.

Tolyl ether: see 2-Hydroxyethyl tolyl Ether.

Naphthyl ether: see 2-Hydroxyethyl naphthyl Ether.

Brooks, Humphrey, *Ind. Eng. Chem.*, 1917, **9**, 750.

Haworth, Perkin, *J. Chem. Soc.*, 1896, **69**, 176.

Niederist, *Ann.*, 1879, **196**, 354.

Ullrich, *Metallbörse*, 1929, **19**, 901, 957, 1013. (*Review of patent literature.*)

Skarblöm, E.P., 369,141, (*Chem. Zentr.*, 1932, II, 121).

Soc. Française de Catalyse Généralisée, F.P., 729,952, (*Chem. Zentr.*, 1932, II, 2107).

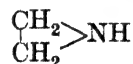
Dreyfus, F.P., 737,612, (*Chem. Zentr.*, 1933, I, 2313).

Schrader, *Z. angew. Chem.*, 1929, **42**, 541.

Clarke, *J. Chem. Soc.*, 1912, **101**, 1802.

Wurtz, *Ann. chim. phys.*, 1859, **55**, 431.

Ethyleneimine (*Aminoethylene*, *dimethyleneimine*, *azirane*)



$\text{C}_2\text{H}_5\text{N}$ MW, 43

Liq. with strong ammoniacal odour. B.p. $55-6^\circ/756$ mm. Misc. with H_2O . D_4^{24} 0.8321. $\text{H}_2\text{S} \rightarrow$ thioethylamine. $\text{SO}_2 \rightarrow$ taurine. Shows strong alkaline reaction. This compound was formerly supposed to be vinylamine, $\text{CH}_2\text{:CH}\cdot\text{NH}_2$, the methods of preparation of which were later shown to give the cyclic imine.

Oxalate: needles. M.p. 115° decomp.

N-Toluenesulphonyl: cryst. from ligroin. M.p. 52° .

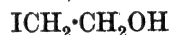
Picrate: m.p. 142° .

Howard, Marckwald, *Ber.*, 1899, **32**, 2036.

Marckwald, *Ber.*, 1900, **33**, 764.

Gabriel, Stelzner, *Ber.*, 1895, **28**, 2929.

Ethylene iodohydrin (*2-Iodoethyl alcohol*, *2-iodo-1-hydroxyethane*)



$\text{C}_2\text{H}_5\text{OI}$ MW, 172

B.p. $176-7^\circ$ part. decomp., $85^\circ/25$ mm. Sol. H_2O . D_4^{20} 2.905. $\text{AgNO}_2 \rightarrow$ 2-nitroethyl alcohol. $\text{Pb}(\text{OH})_2 \rightarrow$ acetaldehyde.

Me ether: methyl 2-iodoethyl ether. $\text{C}_3\text{H}_7\text{OI}$. MW, 186. B.p. $137.8^\circ/750$ mm.

Et ether: see 2-Iododiethyl Ether.

Butlerow, Ossokin, *Ann.*, 1867, **144**, 42.

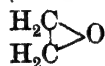
Ethylenelactic Acid.

See Hydracrylic Acid.

Ethylenemalonic Acid.

See Cyclopropane-1:1-dicarboxylic Acid.

Ethylene oxide (*Oxirane*)



$\text{C}_2\text{H}_4\text{O}$ MW, 44

B.p. $13.5^\circ/746.5$ mm. (12.5°). D_4^1 0.8909, D_{10}^{10} 0.8824. n_D^{10} 1.35965. Sol. H_2O . Heat of

comb. C_p 312.55 (308.4) Cal., C_v 307.5 Cal. Reduces $AgNO_3$. $NaHg \rightarrow C_2H_5OH$. $HCl \rightarrow$ ethylene chlorohydrin. $N(CH_3)_3 \rightarrow$ choline. Condenses with hydroxy and amino compounds to give hydroxyethyl derivatives and polymers containing the group $[-O\cdot CH_2\cdot CH_2-]_n$.

Demole, *Ann.*, 1874, **173**, 125.

Roithner, *Monatsh.*, 1894, **15**, 666.

Badische, D.R.P., 299,682, (*Chem. Zentr.*, 1920, IV, 16).

Kahlbaum, F.P., 728,849, (*Chem. Zentr.*, 1932, II, 2532).

Anglo-Persian Oil Co., E.P., 374,864, (*Chem. Zentr.*, 1932, II, 2723).

Soc. Française de Catalyse Généralisée, F.P., 739,562, (*Chem. Zentr.*, 1933, I, 2607).

Schrader, *Z. angew. Chem.*, 1929, **42**, 541.

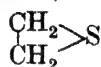
Ethylene oxide carboxylic Acid.

See Glycidic Acid.

Ethylenesuccinic Acid.

See Cyclobutane-1 : 2-dicarboxylic Acid.

Ethylene sulphide (Dimethylene sulphide)



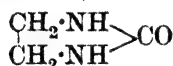
C_2H_4S

MW, 60

Colourless liq. B.p. 55–6°. D_4^{15} 1.0368 (1.0342). n_D^{15} 1.4914 (1.49001). Rapidly polymerises. $CH_3I \rightarrow$ cryst. sulphonium iodide.

Delépine, *Compt. rend.*, 1920, **171**, 36.

Ethyleneurea (2-Ketotetrahydroglyoxaline, tetrahydroimiazolone-2)



$C_3H_6ON_2$

MW, 86

Needles. M.p. 131°. Sol. H_2O , hot EtOH. Spar. sol. Et_2O .

Fischer, Koch, *Ann.*, 1886, **232**, 227.

N-Ethylethanamine.

See 2-Hydroxydiethylamine.

Ethyl Ether.

See Diethyl Ether.

Ethyl ethylaminoformate.

See Ethylurethane.

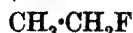
Ethylethylene.

See 1-Butylene.

Ethylethylideneacetone.

See 2-Heptenone-4.

Ethyl fluoride (Fluoroethane)



C_2H_5F

MW, 48

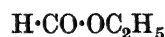
Gas. Liquifies at -32° under atmospheric

press., at 19° under 8 atm. Sol. EtOH, Et_2O . 100 c.c. H_2O dissolve 198 c.c. at 14° . 100 c.c. EtI dissolve 1480 c.c.

Moissan, *Ann. chim. phys.*, 1890, **19**, 272.

Meslans, *Ann. chim. phys.*, 1896, **7**, 94.

Ethyl formate



$C_3H_6O_2$

MW, 74

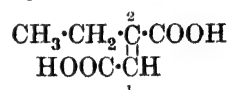
B.p. 54.3° . D_4^{19} 0.92286, D_4^{20} 0.91678. n_D^{20} 1.35975. Heat of comb. (vapour) C_p 400.06 (388.0) Cal., (liq.) C_p 391.7 Cal., C_v 391.4 Cal. $R\cdot C\cdot CNa \rightarrow R\cdot C\cdot C\cdot CHO$.

Bishop, *J. Soc. Chem. Ind.*, 1923, **42**, 401T.

Young, Thomas, *J. Chem. Soc.*, 1893, **63**, 1202.

M.L.B., D.R.P., 315,021, (*Chem. Zentr.*, 1919, IV, 1104).

Ethylfumaric Acid (1-Butylene-1 : 2-dicarboxylic acid, methylmesaconic acid)



$C_6H_8O_4$

MW, 144

Prisms from H_2O . M.p. $194-5^\circ$. Sol. Et_2O . Spar. sol. $CHCl_3$, ligroin. $k = 9.4 \times 10^{-4}$ at 25° . Dist. with $P_2O_5 \rightarrow$ ethylmaleic acid.

1-Et ester : $C_8H_{12}O_4$. MW, 172. Needles from Et_2O . M.p. 88° .

2-Et ester : m.p. 53° .

Di-Et ester : $C_{10}H_{16}O_4$. MW, 200. B.p. $122-3^\circ/12$ mm.

Diamide : $C_6H_{10}O_2N_2$. MW, 142. Leaflets. M.p. $203-4^\circ$.

Anschütz, *Ann.*, 1928, **461**, 169.

Fichter, Goldhaber, *Ber.*, 1904, **37**, 2384.

Bischoff, *Ber.*, 1891, **24**, 2013.

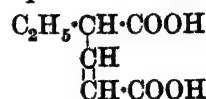
Ethylgalactoside.

See Galactite.

Ethylglucoside.

See under Glucose.

1-Ethylglutaconic Acid (1-Amylene-1 : 3-dicarboxylic acid, 1-pentene-1 : 3-dicarboxylic acid)



$C_7H_{10}O_4$

MW, 158

Exists in two forms. (i) Prisms from $CHCl_3$. M.p. 108° . Hot $HCl \rightarrow$ (ii). (ii) Cryst. from H_2O . M.p. $133-4^\circ$.

Di-Et ester: $C_{11}H_{18}O_4$. MW, 214. B.p. $171^\circ/62$ mm.

Thole, Thorpe, *J. Chem. Soc.*, 1911, **99**, 2199, 2225.

Bland, Thorpe, *J. Chem. Soc.*, 1912, **101**, 1557.

Ethylglycine (*Ethylaminoacetic acid, ethylglycocoll*)

$CH_3 \cdot CH_2 \cdot NH \cdot CH_2 \cdot COOH$
 $C_4H_9O_2N$ MW, 103

Plates from EtOH. M.p. above 160° decomp.
B.HCl: plates. M.p. about 180° .

Et-amide: m.p. $179-179.5^\circ$.

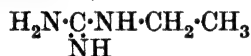
Nitrile: ethylaminoacetoneitrile. $C_4H_8N_2$.
MW, 84. B.p. $166-7^\circ$, $81-3^\circ/29$ mm.

Heintz, *Ann.*, 1864, **129**, 35; 1864, **132**, 1.

Ethylglycylhydroxylamine.

See *N'-Hydroxy-N-ethylurea*.

Ethylguanidine (*Guanidinoethane*)



$C_3H_9N_3$ MW, 87

Free base not described.

$B_2H_2PtCl_6$: decomp. at $188-90^\circ$.

$B_2H_2AuCl_4$: m.p. $100-103^\circ$. Sinters at $78-80^\circ$.

Picrate: m.p. $178-80^\circ$.

Picrolonate: decomp. at 285° .

Schenck, Kirchhof, *Z. physiol. Chem.*, 1926, **154**, 293.

Ethyl heptadecyl Ketone (*Eicosanone-3, 3-ketoicosane*)



$C_{20}H_{40}O$ MW, 296

Leaflets from EtOH. M.p. $60-1^\circ$ (57°). Sol. Et_2O , Me_2CO , $AcOH$, C_6H_6 . Spar. sol. cold EtOH.

Oxime: needles from EtOH. M.p. $55.5-56.5^\circ$. Sol. Et_2O , Me_2CO . Spar. sol. EtOH, pet. ether.

Isonitroso deriv.: needles from pet. ether. M.p. $80-1^\circ$.

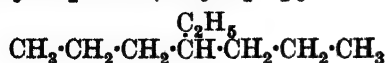
Ponzio, de Gaspari, *Gazz. chim. ital.*, 1899, **29**, I, 474.

Ryan, Nolan, *Chem. Zentr.*, 1913, II, 2050.

1-Ethylheptane.

See Nonane.

4-Ethylheptane (*Ethylidipropylmethane*)



C_9H_{20} MW, 128

Dict. of Org. Comp.—II.

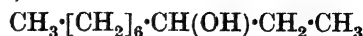
B.p. $138-9^\circ$. D_{20}^{20} 0.7407. n_D^{20} 1.41564.

Oberreit, *Ber.*, 1896, **29**, 2003.

4-Ethylheptanol-4.

See Ethyldipropylcarbinol.

Ethyl-n-heptylcarbinol (*Decanol-3, 3-hydroxydecane*)



$C_{10}H_{22}O$ MW, 158

dl.

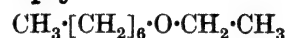
B.p. 213° .

l.

B.p. $108^\circ/15$ mm. D_4^{20} 0.8272. n_D^{20} 1.4336.
 $[\alpha]_D^{20} - 7.67^\circ$ in C_6H_6 , $- 6.21^\circ$ in EtOH.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1945.

Ethyl n-heptyl Ether



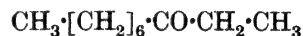
$C_9H_{20}O$ MW, 144

B.p. 166.6° , $165^\circ/748.3$ mm. D_0^{20} 0.7949, D^{18} 0.790.

Cross, *Ann.*, 1877, **189**, 5.

Welt, *Ber.*, 1897, **30**, 1494.

Ethyl n-heptyl Ketone (*Decanone-3, 3-ketodecane*)



$C_{10}H_{20}O$ MW, 156

B.p. 211° . $H \rightarrow$ ethyl-n-heptylcarbinol.

Semicarbazone: m.p. $100-1^\circ$.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1945.

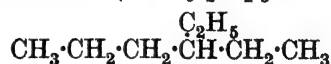
1-Ethylhexane.

See Octane.

2-Ethylhexane.

See 3-Methylheptane.

3-Ethylhexane (*Diethylpropylmethane*)



C_8H_{18} MW, 114

B.p. $116-19^\circ$, $118.8-119^\circ/766$ mm. D_{15}^{20} 0.7175.
 n_D^{20} 1.3993. Heat of comb. C_7 1301 Cal.

Clarke, Riegel, *J. Am. Chem. Soc.*, 1912, **34**, 678.

Pope, Dykstra, Edgar, *J. Am. Chem. Soc.*, 1929, **51**, 2204.

2-Ethylhexanol-1.

See 2-Ethyl-n-hexyl Alcohol.

3-Ethylhexanol-3.

See Diethylpropylcarbinol.

2-Ethyl-*n*-hexyl Alcohol (2-Ethylhexanol-1)

$\text{C}_8\text{H}_{18}\text{O}$ $\text{CH}_3\cdot[\text{CH}_2]_3\cdot\overset{\text{C}_2\text{H}_5}{\underset{|}{\text{CH}}}\cdot\text{CH}_2\text{OH}$ MW, 130
 B.p. 181–3°/743 mm. D_4^{20} 0.8328. n_D^{20} 1.4328.
 Al_2O_3 at 400° → octene.

Levene, Taylor, *J. Biol. Chem.*, 1922, **54**, 351.

Weizmann, Garrard, *J. Chem. Soc.*, 1920, 117, 329.

Ethyl-*n*-hexylcarbinol (Nonanol-3, 3-hydroxynonane)

$\text{C}_9\text{H}_{20}\text{O}$ $\text{CH}_3\cdot[\text{CH}_2]_5\cdot\text{CH}(\text{OH})\cdot\text{CH}_2\cdot\text{CH}_3$ MW, 144
dl.
 F.p. –23° to –22°. B.p. 194.5–195°/750 mm., 99.5–101.5°/24 mm. D_4^{20} 0.825. n_D^{20} 1.42791. Insol. H_2O . Sol. Et_2O , EtOH .

d.
 B.p. 97°/17 mm. $D_4^{16.8}$ 0.8281. n_D^{20} 1.4308.
 $[\alpha]_D^{20} + 8.05^\circ$.

l.
 B.p. 94°/13 mm. D_4^{17} 0.8277. $[\alpha]_D^{17} - 7.96^\circ$.

Bagard, *Bull. soc. chim.*, 1907, **1**, 359.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, 99, 70; 1913, 103, 1945.

Ethyl *n*-hexyl Ether

$\text{C}_8\text{H}_{18}\text{O}$ $\text{CH}_3\cdot[\text{CH}_2]_5\cdot\text{O}\cdot\text{CH}_2\cdot\text{CH}_3$ MW, 130
 B.p. 134–7°, 42°/14 mm.

Lieben, Janecek, *Ann.*, 1877, **187**, 139.

Ethyl *n*-hexyl Ketone (Nonanone-3, 3-ketnonane)

$\text{C}_9\text{H}_{18}\text{O}$ $\text{CH}_3\cdot[\text{CH}_2]_5\cdot\text{CO}\cdot\text{CH}_2\cdot\text{CH}_3$ MW, 142
 F.p. –8°. B.p. 190° (185–6°), 86°/20 mm. D_4^{20} 0.825. CrO_3 → acetic, propionic, caproic and heptylic acids.

Semicarbazone: m.p. 111–12°.

Wagner, *J. prakt. Chem.*, 1891, **44**, 267.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936.

Ethylhydrazine

$\text{C}_2\text{H}_8\text{N}_2$ $\text{CH}_3\cdot\text{CH}_2\cdot\text{NH}\cdot\text{NH}_2$ MW, 60

Ethereal, hygroscopic liq. with ammoniacal odour. B.p. 99.5°/709 mm. Sol. H_2O , EtOH ,

Et_2O , CHCl_3 , C_6H_6 . Fumes in moist air. Corrosive. Attacks cork and rubber. Reduces Fehling's solution. Gives carbylamine reaction with chloroform and potash. $\text{EtI} \rightarrow \text{sym.}$ -diethylhydrazine. $\text{KCNO} \rightarrow$ ethylsemicarbazide.

$\text{B}_2\text{H}_2\text{SO}_4$: plates from hot EtOH . M.p. 110–20°.

Fischer, *Ann.*, 1879, **199**, 287.

Ethyl hydrogen carbonate

$\text{C}_3\text{H}_6\text{O}_3$ $\text{CH}_3\cdot\text{CH}_2\cdot\text{O}\cdot\text{CO}\cdot\text{OH}$ MW, 90
 F.p. –61° to –57°. Unstable at ordinary temps.

K salt: sol. H_2O , EtOH . Insol. Et_2O .

Na salt: sol. H_2O . Spar. sol. EtOH .

Chloride: see Ethyl chloroformate.

Amide: see Urethane.

Hempel, Seidel, *Ber.*, 1898, **31**, 3001.

Faurholt, *Z. physik. Chem.*, 1927, **126**, 227.

Ethyl hydrogen sulphate (Sulphovinic acid, ethyl sulphuric acid)

$\text{C}_2\text{H}_6\text{O}_4\text{S}$ $\text{CH}_3\cdot\text{CH}_2\cdot\text{O}\cdot\text{SO}_3\text{H}$ MW, 126
 Oily liq. Slowly hyd. by H_2O . D_4^{17} 1.316. Heat → ethylene. $\text{EtOH} \rightarrow$ diethyl ether (at 140° → diethyl sulphate). Most of the salts are easily sol. H_2O , and are decomp. on boiling in conc. solution.

NH salt: prisms from EtOH . M.p. 99°.

Na salt, $1\text{H}_2\text{O}$: sol. H_2O .

K salt: sol. in 0.8 part H_2O at 17°.

Mg salt, $4\text{H}_2\text{O}$: sol. H_2O .

Ca salt, $2\text{H}_2\text{O}$: sol. in 0.8 part H_2O at 17°.

Ba salt, $2\text{H}_2\text{O}$: sol. in 0.92 part H_2O at 17°.

Berthelot, *Bull. soc. chim.*, 1873, **19**, 295.

Claesson, *J. prakt. Chem.*, 1879, **19**, 246.

Evans, Albertson, *J. Am. Chem. Soc.*, 1917, **39**, 456.

Compagnie de Béthune, E.P., 221,512, (*Chem. Abstracts*, 1925, **19**, 832).

Popelier, *Bull. soc. chim. Belg.*, 1926, **35**, 264.

Hamid, Singh, Dunncliff, *J. Chem. Soc.*, 1926, 1098.

Ethyl hydrogen sulphite

$\text{C}_2\text{H}_6\text{O}_3\text{S}$ $\text{CH}_3\cdot\text{CH}_2\cdot\text{O}\cdot\text{SO}_2\text{H}$ MW, 110

Unstable in free state. Salts unstable in solid state. Aq. sols. decomp. slowly in cold, rapidly

on heating. Dil. acids \rightarrow SO_2 . Decolourises KMnO_4 .

Rosenheim, Liebknecht, *Ber.*, 1898, **31**, 408.

Divers, Ogawa, *J. Chem. Soc.*, 1899, **75**, 534.

Goldberg, Zimmermann, *Z. angew. Chem.*, 1902, **15**, 899.

Ethyl 1-hydroxybutyl Ketone.

See 4-Heptanolone-3.

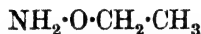
Ethyl 3-hydroxybutyl Ketone.

See 2-Heptanolone-5.

Ethyl 2-hydroxyethyl Ether.

See 2-Hydroxydiethyl Ether.

O-Ethylhydroxylamine (α -Ethylhydroxylamine)



$\text{C}_2\text{H}_7\text{ON}$

MW, 61

Inflammable liq. with strong odour. B.p. 68° . Misc. with H_2O , EtOH , Et_2O . D^{25}_4 0.8827. Alkaline to litmus.

$B_1\text{HCl}$: m.p. 128° .

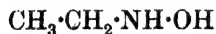
$B_2\text{H}_2\text{PtCl}_6$: m.p. $174-6^\circ$ decomp.

Lossen, Zanni, *Ann.*, 1876, **182**, 222.

Gürke, *Ann.*, 1880, **205**, 274.

Jones, Oesper, *J. Am. Chem. Soc.*, 1914, **36**, 730.

N-Ethylhydroxylamine (β -Ethylhydroxylamine)



$\text{C}_2\text{H}_7\text{ON}$

MW, 61

Needles from ligroin. M.p. $59-60^\circ$. Sol. H_2O , EtOH . Spar. sol. Et_2O , C_6H_6 , cold ligroin. D^{20}_4 0.9079. n^{20}_D 1.41519. Reduces Fehling's. $\text{HI} \rightarrow$ ethylamine. $\text{PhNCO} \rightarrow$ *N*-hydroxy-*N*-ethyl-*N'*-phenylurea. $\text{Na}_3\text{AsO}_3 \rightarrow$ ethylamine.

$B_1\text{HI}$: m.p. 75° .

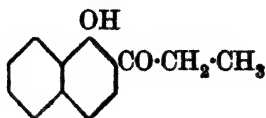
Oxalate: m.p. $95-7^\circ$.

Hantzsch, Hilland, *Ber.*, 1898, **31**, 2065.

Pierron, *Bull. soc. chim.*, 1899, **21**, 784.

Jones, Oesper, *J. Am. Chem. Soc.*, 1914, **36**, 729.

Ethyl 1-hydroxy-2-naphthyl Ketone (1-Hydroxy-2-propionaphthone, 2-propionyl-1-naphthol)



$\text{C}_{13}\text{H}_{12}\text{O}_2$

MW, 200

Greenish-yellow plates from EtOH . M.p. 81° . Alc. $\text{FeCl}_3 \rightarrow$ reddish-brown col. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ orange-yellow col.

Me ether: $\text{C}_{14}\text{H}_{14}\text{O}_2$. MW, 214. Needles from ligroin. M.p. $42-3^\circ$. Semicarbazone: needles from EtOH . M.p. 192° . Oxime: needles from EtOH . M.p. $112-13^\circ$.

Goldzweig, Kaiser, *J. prakt. Chem.*, 1891, **43**, 95.

Hantzsch, *Ber.*, 1906, **39**, 3096.

Heilbron, Hey, Lowe, *J. Chem. Soc.*, 1934, 1314.

Ethyl *p*-hydroxyphenyl sulphide.

See under Thiohydroquinone.

Ethyl 1-hydroxypropyl Ketone.

See Diethylketol.

Ethyl 3-hydroxypropyl Ketone.

See 1-Hexanolone-4.

Ethyl hydroxytolyl Ketone.

See Hydroxymethylpropiophenone.

Ethyl hypochlorite



$\text{C}_2\text{H}_5\text{OCl}$

MW, 80.5

Yellow liq. B.p. $36^\circ/752$ mm. Misc. with Et_2O , CHCl_3 , C_6H_6 . Explodes on heating, or in cold with Cu powder. Decomp. spontaneously, rapidly in sunlight. $\text{HCl} \rightarrow \text{C}_2\text{H}_5\text{OH} + \text{Cl}_2$.

Sandmeyer, *Ber.*, 1886, **19**, 858.

Ethylideneacetone (Methyl propenyl ketone, 2-pentenone-4)



$\text{C}_5\text{H}_8\text{O}$

MW, 84

Colourless liq. with fruity odour, but becomes pungent on keeping. B.p. 122° . D^{20}_4 0.861, D^{20}_D 0.8624. n^{20}_D 1.4350.

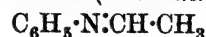
Semicarbazone: m.p. 142° . 2 Mols. semicarbazide hydrochloride \rightarrow semicarbazone of methyl β -semicarbazidopropyl ketone, m.p. 126° .

Claisen, *Ann.*, 1899, **306**, 326.

Wohl, Maag, *Ber.*, 1910, **43**, 3284.

Kyriakides, *J. Am. Chem. Soc.*, 1914, **36**, 534.

Ethylideneaniline (Acetaldehyde anil)



$\text{C}_8\text{H}_9\text{N}$

MW, 119

Oil. Polymerises rapidly to 1 : 3-dianilino-1-butylene. Alkalis \rightarrow aniline. Dil. acids \rightarrow acetaldehyde. $\text{HCN} \rightarrow$ 1-anilinopropionitrile. $\text{H}_2\text{SO}_3 \rightarrow$ 1-anilinoethane-1-sulphonic acid.

Miller, Plöchl, Eckstein, *Ber.*, 1892, **25**, 2030.

Ethylidene bromide (unsym.-Dibromoethane, 1 : 1-dibromoethane)



$\text{C}_2\text{H}_4\text{Br}_2$

MW, 188

B.p. 112.5°/755 mm., 109–10°/751 mm. D_{15}^{15} 2.10294, D_{20}^{20} 2.08540, $D_{17.5}^{17.5}$ 2.10006, D_{20}^{20} 2.05545. n_D^{20} 1.512767. $\text{Br} (+ \text{Fe}) \rightarrow 1:1:2$ -tribromoethane. $\text{PbO} + \text{H}_2\text{O}$ at 130° \rightarrow acetaldehyde. NH_3 at 140° \rightarrow 2-methyl-5-ethylpyridine.

Reboul, *Ann.*, 1870, 155, 30.

Paternó, Pisati, *Ber.*, 1872, 5, 289.

Ethylidene bromoiodide.

See 1-Bromo-1-iodoethane.

2-Ethylidenebutane.

See 3-Methyl-2-pentene.

3-Ethylidenebutyric acid (γ -Amylene- α -carboxylic acid, 2-pentene-5-carboxylic acid, 3-hexenic acid)



$\text{C}_6\text{H}_{10}\text{O}_2$ MW, 114

Exists in two modifications.

(I) M.p. 1°. B.p. 206.5°, 106–8°/8 mm., 73°/0.5 mm. $D_4^{17.2}$ 0.9715. $n_D^{17.2}$ 1.4413. $k = 1.91 (1.74) \times 10^{-5}$ at 25°.

(II) B.p. 111–12°/20 mm. $D_4^{18.7}$ 0.9584. $n_D^{18.7}$ 1.4367.

$\text{KMnO}_4 \rightarrow$ succinic and acetic acids.

Chloride: $\text{C}_6\text{H}_9\text{OCl}$. MW, 132.5. B.p. 48–50°/7 mm.

Anilide: m.p. 87°.

p-Toluidide: m.p. 103°.

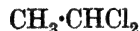
Fichter, *Ber.*, 1896, 29, 2370.

Eccott, Linstead, *J. Chem. Soc.*, 1929, 2163.

Wallach, *Ann.*, 1905, 343, 48.

v. Braun, Kirschbaum, *Ber.*, 1919, 52, 1716.

Ethylidene chloride (unsym.-Dichloroethane, 1:1-dichloroethane)



$\text{C}_2\text{H}_4\text{Cl}_2$ MW, 99

F.p. –96.6° (–101.5°). B.p. 57.3° (59.2°). 100 gm. H_2O dissolve 0.656 gm. at 0°, 0.595 at 10°, 0.550 at 20°, 0.540 at 30°. D_4^0 1.2049, D_4^{15} 1.1835, D_4^{20} 1.1750 (1.1755), D_4^{30} 1.1601. n_D^{15} 1.41975, n_D^{20} 1.41655 (1.41678). Heat of comb. C_v 267.4 Cal., C_p 267.1 Cal. NH_3 in EtOH at 160° \rightarrow 2-methyl-5-ethylpyridine.

Beilstein, *Ann.*, 1860, 113, 110.

D'Ans, Kautzsch, *J. prakt. Chem.*, 1909, 80, 310.

Coleman, Dow Chemical Co., U.S.P., 1,900,276, (*Chem. Abstracts*, 1933, 27, 2965).

Ethylidene chlorobromide.

See unsym.-Chlorobromoethane.

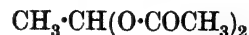
4-Ethylidenecrotonyl Alcohol.

See 2:4-Hexadienol-1.

Ethylidenecyclobutylisobutyric Acid.

See γ -Fencholenic Acid.

Ethylidene diacetate (1:1-Diacetoxyethane)



$\text{C}_6\text{H}_{10}\text{O}_4$ MW, 146

Liq. with sharp, fruity odour. B.p. 168°/740 mm., 113–15°/144 mm., 65–7°/10 mm. D^{12} 1.061. $\text{KOH} \rightarrow$ acetaldehyde.

Knoevenagel, *Ann.*, 1914, 402, 127.

Chemische Fabrik Greisheim-Elektron, D.R.P., 271,381, (*Chem. Zentr.*, 1914, I, 1316).

Consortium für Elektro-chemische Industrie Gesellschaft, E.P., 288,549, (*Chem. Abstracts*, 1929, 23, 608).

Morrison, Shaw, *Transactions of the Electrochemical Society*, 1933, 63, 23.

Walter, Deutsche Gold und Silber-Scheideanstalt vormals Roessler, D.R.Ps., 556,775, 571,318, (*Chem. Abstracts*, 1933, 27, 312, 2696).

Ethylidene-diacetic Acid.

See 2-Methylglutaric Acid.

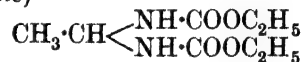
Ethylidene-dianiline.

See Diphenylethylidenediamine.

α -Ethylidenediphenylmethane.

See 1:1-Diphenylpropylene.

Ethylidene-diurethane (Dicarbethoxyethylidenediamine)



$\text{C}_8\text{H}_{16}\text{O}_4\text{N}_2$ MW, 204

Needles. M.p. 125–6°. B.p. 170–8°/20 mm. Sol. MeOH, Me₂CO, CHCl_3 . Spar. sol. Et₂O, ligroin, C_6H_6 .

Curtius, *Ber.*, 1912, 45, 1083.

1-Ethylideneglutaric Acid (γ -Amylene- α -dicarboxylic acid, 2-pentene-3:5-dicarboxylic acid)



$\text{C}_7\text{H}_{10}\text{O}_4$ MW, 158

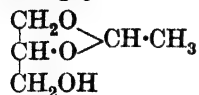
Needles from H_2O . M.p. 152°. Sol. hot H_2O , Et₂O. Spar. sol. CHCl_3 , C_6H_6 , CS_2 , pet. ether. $k = 3.2 \times 10^{-5}$ at 25°.

Anhydride: $\text{C}_7\text{H}_8\text{O}_3$. MW, 140. Needles from Et₂O–pet. ether. M.p. 87°.

Fichter, *Ber.*, 1896, 29, 2369.

Fichter, Eggert, *Ber.*, 1898, 31, 1998.

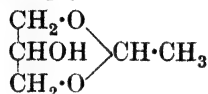
1 : 2-Ethylideneglycerol



$\text{C}_5\text{H}_{10}\text{O}_3$ MW, 118
 B.p. 68–70°/1 mm. D_4^{17} 1.1243. n_D^{17} 1.4413.
Me ether: $\text{C}_6\text{H}_{12}\text{O}_3$. MW, 132. B.p. 56–8°/
 23 mm. D_4^{17} 1.0224. n_D^{17} 1.4177.
Benzoyl: b.p. 144–5°/2 mm. D_4^{17} 1.1618.
 n_D^{17} 1.5145.

Hill, Hill, Hibbert, *J. Am. Chem. Soc.*,
 1928, 50, 2248.

1 : 3-Ethylideneglycerol

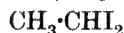


$\text{C}_5\text{H}_{10}\text{O}_3$ MW, 118
 B.p. 52°/1 mm. D_4^{17} 1.1477. n_D^{17} 1.4532.
Me ether: b.p. 80°/23 mm. D_4^{17} 1.0705. n_D^{17}
 1.4375.

Benzoyl: m.p. 86°.

See above reference.

Ethylidene iodide (unsym.-Di-iodoethane)



$\text{C}_2\text{H}_4\text{I}_2$ MW, 282
 B.p. 177–9°. D_0 2.84.

Gustavson, *Ber.*, 1874, 7, 731.

Spindler, *Ann.*, 1885, 231, 266.

3-Ethylidenepentane.

See 3-Ethylpentene-2.

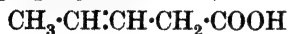
2-Ethylidenepropane.

See 2-Methylbutylene-2.

1-Ethylidenepropionic Acid.

See Angelic Acid and Tiglic Acid.

2-Ethylidenepropionic Acid (2-Penten-
acid, 2-butylene-1-carboxylic acid, 3-methylvinyl-
acetic acid, propenylacetic acid)



$\text{C}_5\text{H}_8\text{O}_2$ MW, 100
 B.p. 191–2°, 93.5–95°/16 mm. D_4^{18} 0.9885.
 $n_{\text{H}_2\text{O}}^{18}$ 1.43569. $k = 3.35 \times 10^{-5}$ at 25°.

Me ester: $\text{C}_6\text{H}_{10}\text{O}_2$. MW, 114. B.p. 72–5°/
 87 mm., 42–3°/18 mm.

Et ester: $\text{C}_7\text{H}_{12}\text{O}_2$. MW, 128. B.p. 51–2°/
 15.5 mm.

Chloride: $\text{C}_5\text{H}_7\text{OCl}$. MW, 118.5. B.p. 53–
 4°/55 mm. D_4^{19} 1.0666. $n_{\text{H}_2\text{O}}^{19}$ 1.44990.

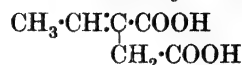
Amide: $\text{C}_6\text{H}_9\text{ON}$. MW, 99. Leaflets from
 C_6H_8 . M.p. 69–70°.

Nitrile: $\text{C}_5\text{H}_7\text{N}$. MW, 81. B.p. 75°/74 mm.
 D_4^{18} 0.8423. $n_{\text{H}_2\text{O}}^{18}$ 1.42358.

p-Bromophenacyl ester: leaflets from C_6H_5 -
 pet. ether. M.p. 87–8°.

Auwers, Meissner, Seydel, Wissebach,
Ann., 1923, 432, 67.

Ethylidene-succinic Acid (1-Methylitaconic
acid, 2-butylene-1 : 2-dicarboxylic acid)



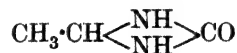
$\text{C}_6\text{H}_8\text{O}_4$ MW, 144

Prisms. M.p. 166–7°. Spar. sol. Et_2O , cold
 H_2O . Insol. CHCl_3 . $k = 9.5 \times 10^{-5}$ at 25°.
 Non-volatile in steam. $\text{Na.Hg} \rightarrow$ ethylsuc-
 cinic acid.

Fittig, Fränkel, *Ann.*, 1889, 255, 36, 40.

Fichter, Pfister, *Ber.*, 1904, 37, 1998.

Ethylidene-urea (Methylmethyleurea, carb-
 onylethylidenediamine)



$\text{C}_3\text{H}_6\text{ON}_2$ MW, 86

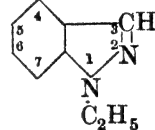
Needles. M.p. 154°. Spar. sol. H_2O , EtOH ,
 Et_2O .

Schiff, *Ann.*, 1869, 151, 204.

4-Ethylidene-n-valeric Acid.

See 4-Heptenic Acid.

1-Ethylindazole



$\text{C}_9\text{H}_{10}\text{N}_2$ MW, 146

Oil. B.p. 233–4°/727 mm., 126–7°/21 mm.

Picrate: yellow needles. M.p. 148–50°.

Auwers, Duesberg, *Ber.*, 1920, 53, 1200.

2-Ethylindazole.

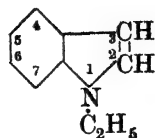
Leaflets from pet. ether. M.p. 37–9°. B.p.
 268°, 140°/14 mm. Sol. H_2O , EtOH . Spar. sol.
 pet. ether. Volatile in steam.

Auwers, Pfuhl, *Ber.*, 1925, 58, 1365.

Fischer, Tafel, *Ann.*, 1885, 227, 314.

See also previous reference.

1-Ethylindole



$\text{C}_{10}\text{H}_{11}\text{N}$

MW, 145

Oil. B.p. 252–3°. $D_{15}^{25} 1.2563$.

Picrate: red needles from ligroin. M.p. 105°.

Michaelis, Robisch, *Ber.*, 1897, **30**, 2811.

2-Ethylindole.

Plates from ligroin. M.p. 43° (35°). B.p. 160–70°/25 mm., 142–3°/5 mm.

Verley, Beduwé, *Bull. soc. chim.*, 1925, **37**, 190.

I.C.I., E.P., 330,332, (*Chem. Zentr.*, 1930, **II**, 2055).

3-Ethylindole.

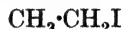
B.p. 282–4°/730 mm. Sol. EtOH, Et₂O, CHCl₃, C₆H₆, ligroin. Spar. sol. H₂O. Insol. dil. acids. Volatile in steam.

Picrate: m.p. 143°.

Pictet, Duparc, *Ber.*, 1887, **20**, 3417.

Korczynski, Brydowna, Kierzek, *Gazz. chim. ital.*, 1926, **56**, 905.

Ethyl iodide (Iodoethane)



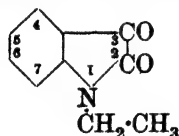
C₂H₅I MW, 156

B.p. 72.3°. $D_{15}^{20} 1.94707$, $D_{15}^{30} 1.91326$. $n_D^{20} 1.51682$. Heat of comb. C_p 356.0 Cal., C_v 355.4 Cal. Mg in Et₂O → C₂H₅MgI. Dry AgNO₂ → nitroethane + ethyl nitrite.

Adams, Voorhees, *J. Am. Chem. Soc.*, 1919, **41**, 797.

Hunt, *J. Chem. Soc.*, 1920, **117**, 1592.

N-Ethylisatin (1-Ethylisatin, 1-ethyl-ψ-isatin)



C₁₀H₉O₂N MW, 175

Red cryst. from Et₂O. M.p. 95°. Sol. EtOH, hot H₂O. Mod. sol. Et₂O. Sol. alkalis with yellow col. of Na salt of N-ethylisatinic acid. Blue col. with H₂SO₄ and crude C₆H₆.

3-Oxime: m.p. 160–2° with previous softening.

Stollé, Bergdoll, Luther, Auerhahn, Wacker, *J. prakt. Chem.*, 1930, **128**, 21.

Geigy, D.R.P., 320,647, (*Chem. Zentr.*, 1920, **IV**, 223).

Martinet, *Ann. chim.*, 1919, **11**, 101.

Michaelis, Robisch, *Ber.*, 1897, **30**, 2813.

5-Ethylisatin.

Red needles. M.p. 137°.

Paucksch, *Ber.*, 1884, **17**, 2806.

Ethylisoamylamine



C₇H₁₇N

MW, 115

B.p. 127°. Spar. sol. H₂O.

B₂H₃PtCl₆: yellow needles.

Nitrosamine: b.p. 144°/85 mm.

Mailhe, *Bull. soc. chim.*, 1919, **25**, 324.

Sabatier, Mailhe, *Compt. rend.*, 1909, **148**, 900.

Durand, *Bull. soc. chim.*, 1897, **17**, 405.

Ethyl isoamylaminoformate.

See Isoamylurethane.

Ethylisoamylaniline



C₁₃H₂₁N

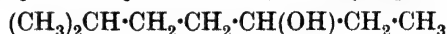
MW, 191

Oil. B.p. 262°.

Picrate: yellow prisms. M.p. 103–4°.

Hofmann, *Ann.*, 1850, **74**, 156.

Ethylisoamylcarbinol (2-Methylheptanol-5)



C₈H₁₈O

MW, 130

Oil. B.p. 165–6°. $n_D^{20} 1.42011$.

Acetyl: b.p. 184–5°. $D_{15}^{20} 0.8554$. $n_D^{20} 1.41602$.

Buelens, *Rec. trav. chim.*, 1909, **28**, 114.

Ethyl isoamyl Ether



C₇H₁₆O

MW, 116

B.p. 112°. $D_{15}^{20} 0.764$. $D_{15}^{21.3} 0.7695$. P₂O₅ → 90% trimethylethylene + 10% isopropylethylene.

Peter, *Ber.*, 1899, **32**, 1419.

Ethyl isoamyl Ketone (3-Keto-6-methylheptane, 2-methylheptanone-5)



C₈H₁₆O

MW, 128

Liq. with pleasant odour resembling camphor. B.p. 163–163.5°/734.2 mm. $D_{15}^{20} 0.8304$. $n_D^{20} 1.42087$.

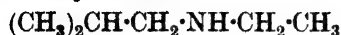
Semicarbazone: cryst. from hot ligroin. M.p. 132–3°.

Ponzio, de Gaspari, *Gazz. chim. ital.*, 1898, **28**, 275.

Bouveault, Locquin, *Bull. soc. chim.*, 1904, **31**, 1158.

2-Ethylisobutane.

See 2:2-Dimethylbutane.

Ethylisobutylamine

$\text{C}_6\text{H}_{15}\text{N}$ MW, 101

B.p. 98°.

$\text{B}_2\text{H}_4\text{Cl}$: m.p. 209° decomp. Sol. H_2O , EtOH , CHCl_3 . Insol. Et_2O .

$\text{B}_2\text{H}_4\text{PtCl}_6$: reddish-yellow cryst. M.p. 201° decomp. Sol. H_2O . Insol. Et_2O . D^{15}_{20} 1.804.

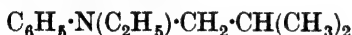
Nitrosamine: b.p. 193°.

Marckwald, v. Droste-Huelshoff, *Ber.*, 1899, **32**, 562.

Le Bel, *Compt. rend.*, 1897, **125**, 351.

Ethyl isobutylaminoformate.

See Isobutylurethane.

Ethylisobutylaniline

$\text{C}_{12}\text{H}_{19}\text{N}$ MW, 177

Oil. B.p. 228–31°/770 mm.

Picrate: m.p. 91–2°.

Fröhlich, *Ber.*, 1909, **42**, 1562.

Ethylisobutylcarbinol (2-Methylhexanol-4)

$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

B.p. 147–8°/756.5 mm.

Wagner, *Bull. soc. chim.*, 1884, **42**, 330.

Ethyl isobutyl Ether

$\text{C}_6\text{H}_{14}\text{O}$ MW, 102

B.p. 81.1°. D^{25}_{20} 0.7323. n^{25}_{D} 1.3739.

Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2097.

Lippert, *Ann.*, 1893, **276**, 160.

Ethyl isobutyl Ketone (2-Methylhexanone-4)

$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

Liq. with peppermint-like odour. B.p. 134.5–135°/735 mm. D^0_{20} 0.829, D^{17}_{20} 0.815.

Oxime: m.p. 129°.

Semicarbazone: m.p. 152° (150°).

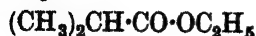
2:4-Dinitrophenylhydrazones: m.p. 75°.

Mailhe, *Compt. rend.*, 1913, **157**, 221.

Fournier, *Bull. soc. chim.*, 1910, **7**, 839.

Wagner, *J. prakt. Chem.*, 1891, **44**, 274.

Douris, *Compt. rend.*, 1913, **157**, 55.

Ethyl isobutyrate

$\text{C}_6\text{H}_{12}\text{O}_2$ MW, 116

B.p. 110°. D^0_{20} 0.89060, D^{20}_{20} 0.86930, D^{40}_{20} 0.84760.

Pribram, Handl, *Monatsh.*, 1881, **2**, 684.

Sabatier, Mailhe, *Compt. rend.*, 1911, **152**, 1046.

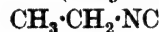
Ethyl isocyanate

$\text{C}_3\text{H}_5\text{ON}$ MW, 71

Pungent smelling liq. B.p. 60°. Heat of comb. C_p 424.4 Cal., C_v 424.2 Cal. At 100° polymerises \rightarrow cryst., m.p. 95°, probably triethylisocyanuric acid. $\text{H} + \text{Ni}$ at 180–90° \rightarrow mainly methylethylamine.

Wurtz, *Ann. chim. phys.*, 1854, **42**, 43.

Gattermann, *Ann.*, 1888, **244**, 36.

Ethyl isocyanide (Ethylcarbylamine)

$\text{C}_3\text{H}_5\text{N}$ MW, 55

B.p. 79° (75–8°). D^4_{20} 0.7591, D^{25}_{20} 0.74421. Heat of comb. C_p 480 Cal. Spar. sol. H_2O . Polymerises on heating to 100–60°. $\text{H} + \text{Ni}$ at 160–70° \rightarrow mainly methylethylamine.

Hofmann, *Ann.*, 1868, **146**, 109.

Gautier, *Ann. chim. phys.*, 1869, **17**, 203, 233.

Guillemard, *Ann. chim. phys.*, 1908, **14**, 363.

Ethyl isonitrosoacetoacetate.

See under Diketobutyric Acid.

Ethylisopropylamine

$\text{C}_5\text{H}_{13}\text{N}$ MW, 87

B.p. 76°. Misc. with H_2O , EtOH .

$\text{B}_2\text{H}_4\text{PtCl}_6$: reddish-yellow cryst. from H_2O . M.p. 180°. D^{15}_{20} 1.885.

Nitrosamine: b.p. 70°/11 mm.

Brill, *J. Am. Chem. Soc.*, 1932, **54**, 2486.

Schuftan, *Ber.*, 1894, **27**, 1010.

Mulder, *Rec. trav. chim.*, 1906, **25**, 105.

Ethyl isopropylaminoformate.

See Isopropylurethane.

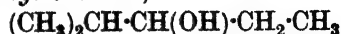
Ethylisopropylaniline

$\text{C}_{11}\text{H}_{17}\text{N}$ MW, 163

Oil. B.p. 214–15° (220° approx.).

$\text{B}_2\text{H}_4\text{PtCl}_6$: m.p. 199°.

v. Braun, *Ber.*, 1900, **33**, 2732.

Ethylisopropylcarbinol (2-Methylpentanol-3, 3-hydroxyisohexane)

$\text{C}_6\text{H}_{14}\text{O}$ MW, 120

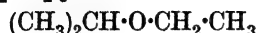
B.p. 129–30°. D_{20}^{20} 0.8243.

Phenylurethane: b.p. 175°/12 mm.

Hopff, *Ber.*, 1931, **64**, 2745.

Sabatier, Senderens, *Compt. rend.*, 1903, **137**, 302.

Ethyl isopropyl Ether



$\text{C}_5\text{H}_{12}\text{O}$ MW, 88

B.p. 53–4°. D_4^{25} 0.720.

Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2097.

Lippert, *Ann.*, 1893, **276**, 158.

Ethyl isopropyl Ketone (2-Methylpentanone-3)



$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. 115–16° (114.5–115°). D_0^{20} 0.830, D_4^{18} 0.814. Does not form bisulphite comp.

Oxime: b.p. 73–5°/11 mm.

Semicarbazone: m.p. 95° (80°).

Hopff, *Ber.*, 1931, **64**, 2744.

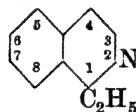
Fournier, *Bull. soc. chim.*, 1910, **7**, 840.

Wagner, *J. prakt. Chem.*, 1891, **44**, 257.

Ethylisopropylphenanthrene.

See Homoretene.

1-Ethylisoquinoline



$\text{C}_{11}\text{H}_{11}\text{N}$ MW, 157

Light yellow oil. B.p. 250°. Sol. EtOH, Et₂O. Insol. H₂O.

Picrate: m.p. 207–10°.

B,HAuCl₄: m.p. 168–72°.

Chloroplatinate: m.p. 199–200°.

Bergstrom, McAllister, *J. Am. Chem. Soc.*, 1930, **52**, 2848.

Späth, Berger, Kuntara, *Ber.*, 1930, **63**, 137.

3-Ethylisoquinoline.

B.p. 255–6°/752 mm.

Picrate: yellow plates from EtOH. M.p. 171–2°.

B,HAuCl₄: yellow needles. M.p. 115–17°.

B₂H₂PtCl₆: needles. M.p. 180° decomp.

Damerow, *Ber.*, 1894, **27**, 2237.

4-Ethylisoquinoline.

M.p. 63.5–65°. B.p. 274–5°.

Gabriel, *Ber.*, 1887, **20**, 1207.

Ethyl isothiocyanate



$\text{C}_3\text{H}_5\text{NS}$ MW, 87

Pungent smelling liq. M.p. –5.9°. B.p. 131–2°. D_0^{20} 1.0192, D_4^{18} 1.0030. n_D^{20} 1.5142. Insol. H₂O. Heat of comb. C_p 604.1 Cal., C_v 602.8 Cal.

Berthelot, *Compt. rend.*, 1900, **130**, 445.

Kaluza, *Monatsh.*, 1912, **33**, 366.

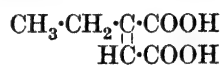
Anschütz, *Ann.*, 1909, **371**, 217.

Hofmann, *Ber.*, 1869, **2**, 452.

Ethylitaconic Acid.

See Propylidenesuccinic Acid.

Ethylmaleic Acid (1-Butylene-1:2-dicarboxylic acid, methylcitraconic acid)



$\text{C}_6\text{H}_8\text{O}_4$ MW, 144

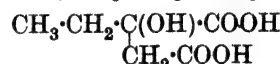
Prisms from H₂O or CHCl₃. M.p. 100–1°. Sol. H₂O, Et₂O, warm CHCl₃. Spar. sol. C₆H₆. Insol. ligroin. Volatile in steam. $k = 2.38 \times 10^{-3}$ at 25°.

Anhydride: C₆H₆O₃. MW, 126. B.p. 142°/66 mm.

Fittig, Fränkel, *Ann.*, 1889, **255**, 33.

Bischoff, *Ber.*, 1890, **23**, 1936.

1-Ethylmalic Acid (2-Hydroxybutane-1:2-dicarboxylic acid, 1-hydroxy-1-ethylsuccinic acid)

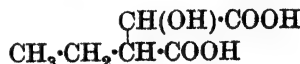


$\text{C}_6\text{H}_{10}\text{O}_5$ MW, 162

Prisms from Et₂O. M.p. 131–3°.

Ssamenow, *Chem. Zentr.*, 1899, **I**, 1205.

2-Ethylmalic Acid (1-Hydroxybutane-1:2-dicarboxylic acid, 2-hydroxy-1-ethylsuccinic acid)



$\text{C}_6\text{H}_{10}\text{O}_5$ MW, 162

Exists in three forms.

(I) Cryst. from Et₂O–C₆H₆. M.p. 108°. Sol. H₂O, EtOH, Et₂O, Me₂CO, AcOEt.

Monoamide: C₈H₁₁O₄N. MW, 161. M.p. 158–9°.

(II) Prisms from Et₂O–pet. ether. M.p. 133–4°. Dist. → ethylmaleic, ethylfumaric, and ethylidenesuccinic acids.

Eth ester: C₈H₁₄O₅. MW, 190. B.p. 133–5°.

Ethylmalonic Acid

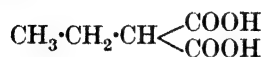
(III) M.p. 86–7°. Sol. H₂O, EtOH, Et₂O, CHCl₃, C₆H₆, pet. ether. Dist. → ethylmaleic acid.

Lutz, *Ber.*, 1902, **35**, 4372.

Fichter, Goldhaber, *Ber.*, 1904, **37**, 2382.

Doebner, Segelitz, *Ber.*, 1905, **38**, 2735.

Ethylmalonic Acid (*Propane-1:1-dicarboxylic acid*)



C₅H₈O₄ MW, 132

Prisms + 1H₂O from H₂O. M.p. anhyd. 111.5°. Sol. EtOH, Et₂O. k (first) = 1.27×10^{-3} at 25°; (second) = 0.54×10^{-6} . At 160° → butyric acid.

Di-Me ester: C₇H₁₂O₄. MW, 160. B.p. 178–9°. D₄¹ 1.104.

Di-Et ester: C₉H₁₆O₄. MW, 188. B.p. 207–9°/755 mm., 92°/10 mm., 77°/5 mm. D₁₆¹⁵ 1.008.

Dichloride: C₅H₆O₂Cl₂. MW, 169. B.p. 76–82°/35 mm.

Mononitrile: see 1-Cyanobutyric Acid.

Dinitrile: 1:1-dicyanopropane. C₅H₆N₂. MW, 94. B.p. 206°/756 mm., 90–1°/20 mm. D₁₁¹ 0.9515. Sol. EtOH, Et₂O, CHCl₃. Spar. sol. H₂O.

Amide: C₅H₁₀O₂N₂. MW, 130. Cryst. from H₂O or EtOH. M.p. 216° (212°). Spar. sol. H₂O, MeOH, EtOH. Insol. Et₂O, CHCl₃.

Dihydrazide: needles from EtOH. M.p. 168°.

Michael, *J. prakt. Chem.*, 1905, **72**, 539, 550.

Markownikoff, *Ann.*, 1876, **182**, 329.

Wislicenus, Urech, *Ann.*, 1873, **165**, 93.

Conrad, *Ann.*, 1880, **204**, 134.

Ethyl Mercaptan (*Mercaptoethane, thioethyl alcohol*)



C₂H₆S MW, 62

Liq. with leek-like odour. M.p. –144.4°. B.p. 37°. D₄¹ 0.86174, D₄²⁰ 0.83147. n_D^{20} 1.4351. Very spar. sol. H₂O. Sol. alkalis. Dil. HNO₃ → diethyl disulphoxide. Conc. HNO₃ → ethane-sulphonic acid.

Sabatier, Mailhe, *Compt. rend.*, 1910, **150**, 1219.

Klason, *Ber.*, 1887, **20**, 3411.

Ethylmesaconic Acid.

See Propylfumaric Acid.

Ethyl methylaminoformate.

See Methylurethane.

N-Ethyl-2-naphthylamine

1-Ethyl-naphthalene (α -Ethyl-naphthalene, 1-naphthylethane)



C₁₂H₁₂ MW, 156

M.p. 15°. B.p. 251–2° (256.5°/756 mm.), 112–16°/8 mm., 100°/2–3 mm. D₀¹ 1.0221, D_{14.2}¹ 1.0111. $n_D^{14.2}$ 1.6089.

Picrate: m.p. 98.5°.

Fröschl, Harlass, *Monatsh.*, 1932, **59**, 280.

Lévy, *Compt. rend.*, 1931, **193**, 174.

Clemmensen, *Ber.*, 1913, **46**, 1840.

Darzens, Rost, *Compt. rend.*, 1908, **146**, 933.

2-Ethyl-naphthalene (β -Ethyl-naphthalene, 2-naphthylethane).

M.p. –7.5°. B.p. 252°, 117–18°/10 mm. D₀¹ 1.0069, D₁₅¹ 0.9958. n_D^{15} 1.6028.

Picrate: m.p. 76–7° (72–3°).

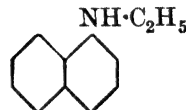
Lévy, *Compt. rend.*, 1931, **192**, 1397.

Barbot, *Bull. soc. chim.*, 1930, **47**, 1314.

Marchetti, *Gazz. chim. ital.*, 1881, **11**, 439.

Darzens, Rost, *Compt. rend.*, 1908, **146**, 934.

N-Ethyl-1-naphthylamine (*Ethyl- α -naphthylamine*)



C₁₂H₁₃N MW, 171

B.p. 303°/722.5 mm., 191°/16 mm.

B,HCl: m.p. 193°.

Knoevenagel, Dieterich, *J. prakt. Chem.*, 1914, **89**, 34.

Morgan, Micklethwait, *J. Chem. Soc.*, 1907, **91**, 1516.

N-Ethyl-2-naphthylamine (*Ethyl- β -naphthylamine*)



C₁₂H₁₃N MW, 171

B.p. 316–17°, 191°/25 mm., 167°/10–12 mm.

B,HCl: plates. M.p. 238° (235°).

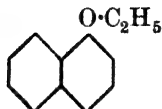
Meisenheimer, *Ann.*, 1911, **385**, 128.

Reychler, *Bull. soc. chim.*, 1902, **27**, 882.

Bischoff, Hausdörfer, *Ber.*, 1892, **25**, 2312.

Fischer, *Ber.*, 1893, **26**, 193.

Ethyl 1-naphthyl Ether (α -Naphthol ethyl ether)



$C_{12}H_{12}O$ MW, 172

M.p. 5.5° . B.p. 276.4° (280°), $186-7^\circ/66$ mm. $152-4^\circ/18$ mm., $106-106.5^\circ/2$ mm. D_4^{20} 1.0711. n_D^{20} 1.59509.

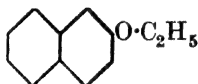
$C_{12}H_{12}O, C_6H_3(NO_2)_3-1:3:5$: yellow needles. M.p. 125.5° .

Kamm, McClugage, Landstrom, *J. Am. Chem. Soc.*, 1917, **39**, 1245.

Witt, Schneider, *Ber.*, 1901, **34**, 3172.

Schaeffer, *Ann.*, 1869, **152**, 286.

Ethyl 2-naphthyl Ether (*Nerolin II*, *Bromelia*)



$C_{12}H_{12}O$ MW, 172

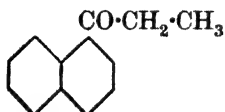
Plates. M.p. 37.5° . B.p. 282° ($274-5^\circ$). D_4^{20} 1.0640. Sol. EtOH, Et₂O, pet. ether, CS₂, toluene. Insol. H₂O. Used in perfumery.

$C_{12}H_{12}O, C_6H_3(NO_2)_3-1:3:5$: yellow needles. M.p. 95° .

Davis, *J. Chem. Soc.*, 1900, **77**, 35.

Schaeffer, *Ann.*, 1869, **152**, 287.

Ethyl 1-naphthyl Ketone (α -Propionaphthone, 1-propionynaphthalene, ethyl α -naphthyl ketone)



$C_{13}H_{12}O$ MW, 184

B.p. $305-7^\circ$, $166-8^\circ/8$ mm. D_4^{20} 1.1082. n_D^{20} 1.606. Sol. EtOH, Et₂O, CS₂. Spar. sol. pet. ether. $HNO_3 \rightarrow$ 1-naphthoic acid.

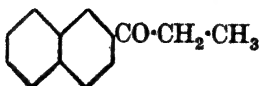
Oxime: cryst. from ligroin. M.p. $57-8^\circ$.

Picrate: needles from EtOH. M.p. $77-8^\circ$.

Caille, *Compt. rend.*, 1911, **153**, 393.

Rousset, *Bull. soc. chim.*, 1896, **15**, 62.

Ethyl 2-naphthyl Ketone (β -Propionaphthone, 2-propionynaphthalene, ethyl β -naphthyl ketone)



$C_{13}H_{12}O$ MW, 184

M.p. 60° . B.p. $312-14^\circ$, $181-3^\circ/18$ mm. Sol.

EtOH, CHCl₃. Spar. sol. H₂O, pet. ether. $HNO_3 \rightarrow$ 2-naphthoic acid.

Oxime: needles from EtOH.Aq. M.p. 133° .

Semicarbazone: m.p. $190-1^\circ$.

Barbot, *Bull. soc. chim.*, 1930, **47**, 1319.

Rousset, *Bull. soc. chim.*, 1896, **15**, 62; 1897, **17**, 313.

Ethylnitramine (*N-Nitroethylamine*)



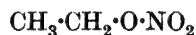
$C_2H_6O_2N_2$ MW, 90

F.p. 6° . D^{15} 1.1675. Heat of comb. C_p 372.82 Cal. Acid reaction. Forms salts. 40% $H_2SO_4 \rightarrow$ ethylene + N_2O .

Franchimont, Klobbie, *Rec. trav. chim.*, 1888, **7**, 356.

Umbgrove, Franchimont, *Rec. trav. chim.*, 1897, **16**, 388.

Ethyl nitrate



$C_2H_5O_3N$ MW, 91

M.p. -112° . B.p. $87.5-87.7^\circ$. D_4^{20} 1.1305, $D_4^{20.7}$ 1.106, D_4^{20} 1.1004. Heat of comb. C_p 324.04 Cal. Sol. H₂O. $Sn + HCl \rightarrow$ hydroxylamine + a base $C_4H_{11}ON$. $H_2S + NH_3 \rightarrow C_2H_5 \cdot SH$.

Millon, *Ann.*, 1843, **47**, 373.

Biron, *Chem. Zentr.*, 1901, **I**, 366.

Ethyl nitrite



$C_2H_5O_2N$ MW, 75

B.p. 17° . $D^{15.5}$ 0.900. Heat of comb. C_p 334.21 Cal.

Thiele, Eichwede, *Ann.*, 1900, **311**, 366.

Wallach, Otto, *Ann.*, 1889, **253**, 251.

Feldhaus, *Ann.*, 1863, **126**, 73.

Ethylnitrolic Acid (*Acetonitrolic acid*)



$C_2H_4O_3N_2$ MW, 104

Cryst. from H₂O or Et₂O. M.p. $87-8^\circ$. Sol. most org. solvents. Reacts acid to litmus. $Sn + HCl \rightarrow$ hydroxylamine + $CH_3 \cdot COOH$. Forms three series of salts: red, yellow and colourless.

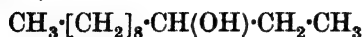
Steinkopf, Jürgens, *J. prakt. Chem.*, 1911, **84**, 711.

Behrend, Tryller, *Ann.*, 1894, **283**, 239.

Meyer, Constam, *Ann.*, 1882, **214**, 329.

Wieland, *Ann.*, 1907, **353**, 82.

Ethylonylcarbinol (*Dodecanol-3, 3-hydroxydodecane*)



$\text{C}_{12}\text{H}_{26}\text{O}$ MW, 186

l.

M.p. 25°. B.p. 130°/15 mm. D_4^{20} 0.8223. $[\alpha]_D^{20}$ -6.10° in EtOH. Volatile in steam.

Acid phthalate: needles. M.p. 25°. $[\alpha]_D^{20}$ -15.60° in EtOH.

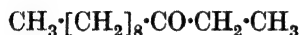
dl.

M.p. 12°. B.p. 133°/14 mm.

Acid phthalate: m.p. 31-2°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1947.

Ethyl nonyl Ketone (*Dodecanone-3, 3-ketododecane*)



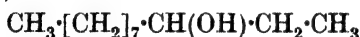
$\text{C}_{12}\text{H}_{24}\text{O}$ MW, 184

M.p. 19°. B.p. 134°/18 mm.

Semicarbazone: cryst. from EtOH.Aq. M.p. 89°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936.

Ethyl octylcarbinol (*Undecanol-3, 3-hydroxyundecane*)



$\text{C}_{11}\text{H}_{24}\text{O}$ MW, 172

l.

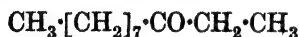
Needles. M.p. 17°. B.p. 117°. D_4^{20} 0.8295. n_D^{20} 1.4367. $[\alpha]_D^{20}$ -6.22° in EtOH. Volatile in steam.

dl.

B.p. 229°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1946.

Ethyl octyl Ketone (*Undecanone-3, 3-ketoundecane*)



$\text{C}_{11}\text{H}_{22}\text{O}$ MW, 170

B.p. 227°, 104-6°/11 mm.

Semicarbazone: cryst. from EtOH.Aq. M.p. 90°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936, 1946.

Ethyl oxamic Acid



$\text{C}_4\text{H}_7\text{O}_5\text{N}$ MW, 117

M.p. 120°. Sol. H_2O , EtOH, Et_2O . Sublimes.

Et ester: $\text{C}_6\text{H}_{11}\text{O}_3\text{N}$. MW, 145. B.p. 244-6°. Misc. with H_2O , EtOH, Et_2O , CHCl_3 .

Amide: $\text{C}_4\text{H}_8\text{O}_2\text{N}_2$. MW, 116. Needles from H_2O . M.p. about 202-3°. Sol. Et_2O , hot H_2O , hot EtOH.

Baum, D.R.P., 77,597.

Heintz, *Ann.*, 1863, 127, 48.

Wurtz, *Ann. chim.*, 1850, 30, 490.

Ethylpentadecylcarbinol (*Octadecanol-3, 3-hydroxyoctadecane*)



$\text{C}_{18}\text{H}_{38}\text{O}$ MW, 270

l.

Prisms from EtOH. M.p. 56°. B.p. 172°/2 mm. D_4^{20} 0.8011. $[\alpha]_D^{20}$ -4.78° in EtOH.

Acid phthalate: m.p. 32-3°. $[\alpha]_D^{20}$ -15.62° in EtOH.

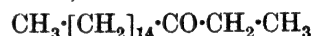
dl.

M.p. 43°. B.p. 202°/13 mm.

Acid phthalate: m.p. 39-41°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1953.

Ethyl pentadecyl Ketone (*Octadecanone-3, 3-keto-octadecane*)



$\text{C}_{18}\text{H}_{36}\text{O}$ MW, 268

Prisms from EtOH- Et_2O . M.p. 53° (50°). B.p. 198°/14 mm. (197.5°/11 mm.).

Oxime: m.p. 44°.

Semicarbazone: cryst. from EtOH.Aq. M.p. 76°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936, 1953.

Bertrand, *Bull. soc. chim.*, 1896, 15, 765.

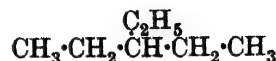
1 - Ethyl - 4 - pentadecyltetramethylene Glycol.

See Heneicosandiol-3 : 6.

1-Ethylpentamethylene Glycol.

See Heptandiol-1 : 5.

3-Ethylpentane (*Triethylmethane*)



C_7H_{16} MW, 100

B.p. 93.3°. D_4^{20} 0.6984. n_D^{20} 1.39366.

Böeseken, Wildschut, *Rec. trav. chim.*, 1932, 51, 168.

Edgar, Calingaert, Marker, *J. Am. Chem. Soc.*, 1929, 51, 1483.

3-Ethylpentanol-3.

See Triethylcarbinol.

3-Ethylpentanol-4.

See Methyl-sec.-n-amylcarbinol.

3-Ethylpentanone-2 (Diethylacetone, 3-acetopentane, methyl sec.-n-amyl ketone, 2-keto-3-ethylpentane)

$\text{C}_7\text{H}_{14}\text{O}$ $\text{CH}_3\cdot\text{CH}_2\cdot\overset{\text{C}_2\text{H}_5}{\text{C}}\cdot\text{CO}\cdot\text{CH}_3$ MW, 114
 B.p. 138–40°, 38–42°/19 mm.
 Oxime: b.p. 186–188.5°/712 mm.
 Semicarbazone: m.p. 99°.

Bardan, *Bull. soc. chim.*, 1931, **49**, 1876.Frankland, Duppa, *Ann.*, 1866, **138**, 212.**3-Ethylpentene-2** (1-Methyl-2:2-diethyl-ethylene, 3-ethylidenepentane)

C_7H_{14} $\text{CH}_3\cdot\text{CH}_2\cdot\overset{\text{C}_2\text{H}_5}{\text{C}}\cdot\text{CH}\cdot\text{CH}_3$ MW, 98
 B.p. 96°/764 mm. $D_4^{24.5}$ 0.7191. n_D^{20} 1.4139.
 Böeseken, Wildschut, *Rec. trav. chim.*, 1932, **51**, 169.
 Edgar, Calingaert, Marker, *J. Am. Chem. Soc.*, 1929, **51**, 1486.
 Saizew, *J. prakt. Chem.*, 1898, **57**, 38.


Ethyl perchlorate

$\text{C}_2\text{H}_5\text{O}_4\text{Cl}$ $\text{CH}_3\cdot\text{CH}_2\cdot\text{O}\cdot\text{ClO}_3$ MW, 128.5
 Oil. Decomp. readily with explosion in dry state. Distilled under layer of H_2O , b.p. 74°.
 Roscoe, *Ann.*, 1862, **124**, 124.

Ethyl peroxide.

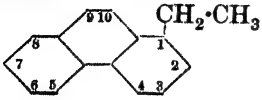
See Diethyl peroxide.

4-Ethylphenacyl Alcohol (4-Ethylbenzoylcarbinol, ω -hydroxy-4-ethylacetophenone)

$\text{C}_{10}\text{H}_{12}\text{O}_2$ $\text{CO}\cdot\text{CH}_2\text{OH}$

 MW, 164
 Yellow plates from pet. ether. M.p. 67–8°.
 Sol. EtOH, Et₂O, C₆H₆. Spar. sol. pet. ether.
 Acetyl: prisms from ligroin or MeOH. M.p. 61–2°.

Semicarbazone: plates from MeOH. M.p. 161°.

Auwers, *Ber.*, 1906, **39**, 3759.**1-Ethylphenanthrene**

$\text{C}_{16}\text{H}_{14}$ $\text{CH}_2\cdot\text{CH}_3$

 MW, 206

Prisms from EtOH. M.p. 62.5°.

Picrate: orange prisms from EtOH. M.p. 108–9°.

Styphnate: yellow needles from EtOH. M.p. 144°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.**2-Ethylphenanthrene.**

Leaflets from MeOH. M.p. 67–8° (64–5°).

Picrate: yellow needles from EtOH. M.p. 95.5–96° (92–3°).

Mosettig, van de Kamp, *J. Am. Chem. Soc.*, 1933, **55**, 3447.Haworth, Mavin, *J. Chem. Soc.*, 1933, 1015.**3-Ethylphenanthrene.**

Liq.

Picrate: orange-red needles from EtOH. M.p. 121.5–122°.

Styphnate: orange prisms from MeOH. M.p. 114–16°.

See above references.

9-Ethylphenanthrene.Needles from C₆H₆-pet. ether. M.p. 62.5–63°. B.p. 198–200°/11 mm.

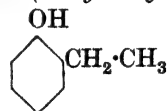
Picrate: orange-red prisms from EtOH. M.p. 123–4°.

Mosettig, van de Kamp, *J. Am. Chem. Soc.*, 1933, **55**, 3447.**N-Ethylphenetidine.**

See under Ethylaminophenol.

Ethylphenetole.

See under Ethylphenol.

o-Ethylphenol (2-Hydroxy-1-ethylbenzene) $\text{C}_8\text{H}_{10}\text{O}$ MW, 122B.p. 206.5–207.5°. Sol. EtOH, AcOH, C₆H₆. Very spar. sol. H₂O. FeCl₃ → blue col.*Me ether*: o-ethylanisole, 2-methoxy-1-ethylbenzene. C₉H₁₂O. MW, 136. B.p. 186–8°/755 mm. 70–71°/11 mm. D_4^{19} 0.9636. n_D^{19} 1.512.*Et ether*: o-ethylphenetole, 2-ethoxy-1-ethylbenzene. C₁₀H₁₄O. MW, 150. B.p. 189–92°.Beilstein, Kuhlberg, *Ann.*, 1870, **156**, 211.Sempotowski, *Ber.*, 1889, **22**, 2672.Marschalk, *Ber.*, 1910, **43**, 1699.Klages, Eppelsheim, *Ber.*, 1903, **36**, 3591.**m-Ethylphenol** (3-Hydroxy-1-ethylbenzene).M.p. –4°. B.p. 214°/752 mm. D_0 1.0250. FeCl₃ → violet col.

Me ether: *m*-ethylanisole, 3-methoxy-1-ethylbenzene. B.p. 196–7°/758 mm., 77–8°/12 mm. D_4^{18} 0.95746. n_D 1.5102.

Acetyl: b.p. 222–3°. D_0 1.0403.

Sempotowski, *Ber.*, 1889, **22**, 2674.

Béhal, Choay, *Bull. soc. chim.*, 1894, **11**, 211.

Klages, Eppelsheim, *Ber.*, 1903, **36**, 3592.

p-Ethylphenol (4-Hydroxy-1-ethylbenzene).

Needles. M.p. 47–8° (45–6°). B.p. 218.5–219.5°. Sol. EtOH, Et₂O, C₆H₆, CS₂. FeCl₃ → deep blue col. Acetyl deriv. by Fries rearrangement → 2-hydroxy-5-ethylacetophenone.

Me ether: *p*-ethylanisole, 4-methoxy-1-ethylbenzene. B.p. 195–6°, 83–4°/16 mm., 75°/10 mm. D_4^{15} 0.9624. n_D 1.5094.

Et ether: *p*-ethylphenetole, 4-ethoxy-1-ethylbenzene. B.p. 211°, 92–3°/12 mm. D_4^{17} 0.9385.

Acetyl: b.p. 226–7°/750 mm.

Zincke, *Ann.*, 1902, **322**, 187 (Footnote).

Clemmensen, *Ber.*, 1914, **47**, 53.

Johnson, Hodge, *J. Am. Chem. Soc.*, 1913, **35**, 1018.

Baranger, *Bull. soc. chim.*, 1931, **49**, 1216.

Klages, Eppelsheim, *Ber.*, 1903, **36**, 3593.

Schering, E.P., 274,439, (*Chem. Zentr.*, 1929, II, 96).

1-Ethyl-2-phenylacetylene.

See 1-Phenylbutine-1.

Ethylphenylbarbituric Acid.

See Luminal.

Ethylphenylcarbinol (α -Hydroxypropylbenzene, ω -ethylbenzyl alcohol)



C₉H₁₂O MW, 136

B.p. 217–21°, 106–8°/18 mm., 105–8°/10 mm. D_0^{16} 1.016, D_0^{25} 0.994. *p*-Nitrobenzoyl chloride

→ mainly 1-chloro-1-phenylpropane.

Acetyl: b.p. 227–8°.

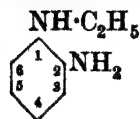
p-Nitrobenzoyl: m.p. 59–60°.

Davies, Kipping, *J. Chem. Soc.*, 1911, **99**, 298.

Tschelinceff, *Ber.*, 1904, **37**, 4539.

Klages, *Ber.*, 1902, **35**, 2251.

Ethyl-o-phenylenediamine (*o*-Amino-ethyl aniline, 1-ethylamino-2-aminobenzene)



C₈H₁₂N₂

MW, 136

Oil. B.p. 248–9°.

Hempel, *J. prakt. Chem.*, 1890, **41**, 164; 1889, **39**, 199.

Ethyl-m-phenylenediamine (*m*-Amino-ethyl aniline, 1-ethylamino-3-aminobenzene).

B.p. 276°.

Nölting, Stricker, *Ber.*, 1886, **19**, 547.

Badische, D.R.P., 76,419.

Ethyl-p-phenylenediamine (*p*-Amino-ethyl aniline, 1-ethylamino-4-aminobenzene).

B.p. 270°, 261–2°/746 mm. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O.

Fischer, Hepp, *Ber.*, 1886, **19**, 2994.

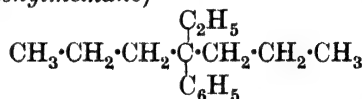
Schweitzer, *Ber.*, 1886, **19**, 149.

Oehler, D.R.P., 12,932.

Ethyl phenyl Ether.

See Phenetole.

4-Ethyl-4-phenylheptane (3-Propyl-3-phenylhexane, ω -ethylidipropyltoluene, ethyldipropylphenylmethane)



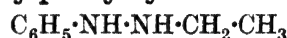
C₁₅H₂₄

MW, 204

B.p. 127–8°/15 mm. D_4^{20} 0.8698. n_D^{15} 1.49211.

Halse, *J. prakt. Chem.*, 1914, **89**, 457.

sym.-Ethylphenylhydrazine



C₈H₁₂N₂

MW, 136

B.p. 235–6°/741 mm., 110°/14 mm., 100–104°/10 mm. D_4^{15} 1.004. n_D^{15} 1.55. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. Reduces Fehling's.

B,HCl: leaflets from EtOH–Et₂O. M.p. 164°.

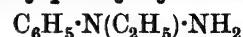
B,(COOH)₂: needles from EtOH. M.p. 167–8° decomp.

N-Benzoyl: prisms from EtOH.Aq. M.p. 100°.

Fischer, Ehrhard, *Ann.*, 1879, **199**, 330.

Knorr, Weidel, *Ber.*, 1909, **42**, 3528.

unsym.-Ethylphenylhydrazine



C₈H₁₂N₂

MW, 136

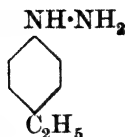
Oil. B.p. 237°. D_4^{15} 1.018. Reduces warm Fehling's.

B,HCl: leaflets from CHCl₃. M.p. 137°.

Fischer, *Ber.*, 1875, **8**, 1642.

Michaelis, Philips, *Ann.*, 1889, **252**, 270.

Michaelis, Robisch, *Ber.*, 1897, **30**, 2810.

p-Ethylphenylhydrazine (4-Hydrazino-1-ethylbenzene)C₈H₁₂N₂ MW, 136

Leaflets. Unstable even in form of salts.
Sol. H₂O, EtOH, Et₂O, CHCl₃, Me₂CO, C₆H₆.

B, HCl: leaflets. M.p. 200°.

B, H₂SO₄: reddish leaflets from H₂O. M.p. 180°.

Picrate: yellow needles. M.p. 122°.

Willgerodt, Harter, *J. prakt. Chem.*, 1905,
71, 410.

Ethyl phenyl Ketone.

See Propiophenone.

Ethyl phenyl sulphide.

See Thiophenetole.

Ethyl phenyl sulphoneC₈H₁₀O₂S MW, 170

Leaflets from EtOH.Aq. M.p. 42°. B.p. 160°/12 mm. Sol. EtOH, Et₂O, CHCl₃, C₆H₆.
Spar. sol. cold H₂O.

Otto, *Ber.*, 1880, 13, 1274; 1885, 18, 161.

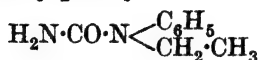
Ferns, Lapworth, *J. Chem. Soc.*, 1912,
101, 284.

sym.-EthylphenylureaC₉H₁₂ON₂ MW, 164

Needles from EtOH.Aq. M.p. 104° (99°).

Sonn, *Ber.*, 1914, 47, 2442.Mauguin, *Ann. chim.*, 1911, 22, 318.

Oliveri-Mandalà, Noto, *Gazz. chim. ital.*,
1913, 43, I, 311.

unsym.-EthylphenylureaC₉H₁₂ON₂ MW, 164

Plates from pet. ether. M.p. 62.3–62.5°.
Very sol. H₂O and org. solvents except ligroin.

Davis, Blanchard, *J. Am. Chem. Soc.*,
1929, 51, 1800.

Gebhardt, *Ber.*, 1884, 17, 2095.**Ethyl phosphate.**

See Triethyl phosphate.

EthylphosphineC₂H₇P

MW, 62

Liq. with unpleasant odour. B.p. 25°. De-
comp. by H₂O.

Hofmann, Mahla, *Ber.*, 1892, 25, 2437.Berthaud, *Compt. rend.*, 1906, 143, 1166.**Ethylphosphinic Acid**C₂H₇O₃P MW, 110

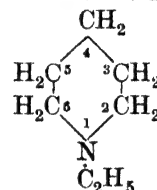
Hygroscopic cryst. M.p. 44°.

Di-Et ester: C₆H₁₅O₃P. MW, 166. B.p. 198° (203°/750 mm.), 90–95°/20 mm. D₄²⁰ 1.0259. n_D²⁰ 1.4163.

Dichloride: C₂H₅OCl₂P. MW, 147. B.p. 175°, 75–8°/50 mm. D₂₀ 1.1883.

Hofmann, *Ber.*, 1872, 5, 110.Michaelis, *Ber.*, 1880, 13, 2175.Guichard, *Ber.*, 1899, 32, 1578.Michaelis, Becker, *Ber.*, 1897, 30, 1006.**1-Ethylpimelic Acid.**

See Heptane-1:5-dicarboxylic Acid.

N-Ethylpiperidine (*Ethylpiperidylamine*)C₇H₁₅N MW, 113B.p. 128°. D₄²⁰ 0.82373. n_D²⁰ 1.44158.B₂H₂PtCl₆: orange prisms. M.p. 202°.B, H₂AuCl₄: yellow cryst. M.p. 106–7°.

Picrate: yellow needles from EtOH. M.p. 167.5°.

Winans, Adkins, *J. Am. Chem. Soc.*,
1932, 54, 310.

Evans, *J. Chem. Soc.*, 1897, 71, 523.Dennstedt, *Ber.*, 1890, 23, 2571.Clarke, *J. Chem. Soc.*, 1912, 101, 1807.**2-Ethylpiperidine** (*α-Ethylpiperidine*).

B.p. 142–3°/719 mm. D₄²⁰ 0.8651. Spar. sol.
H₂O.

B, HCl: m.p. 181–2°.

B₂H₂PtCl₆: prisms. M.p. 208–10° decomp.B, H₂AuCl₄: m.p. 129–30°.*Picrate*: prisms. M.p. 133°.

N-Benzenesulphonyl: leaflets or plates from
EtOH.Aq. M.p. 64–5°.

Lipp, *Ber.*, 1900, 33, 3513.Ladenburg, *Ber.*, 1898, 31, 290.**3-Ethylpiperidine** (*β-Ethylpiperidine*).

Oil. B.p. 152.6°. D₄²⁰ 0.871. Spar. sol.
H₂O. Fumes in air.

B, HCl: needles from C_6H_6 . M.p. 141–2°.
B, HI: m.p. 123°.
B₂H₂PtCl₆: m.p. 183–4°.
B, HAuCl₄: m.p. 112°.
Picrate: m.p. 63°.

Stoehr, *J. prakt. Chem.*, 1892, **45**, 44.
 Ladenburg, *Ann.*, 1898, **301**, 149.
 Günther, *Ber.*, 1898, **31**, 2140.

4-Ethylpiperidine (*γ*-Ethylpiperidine).

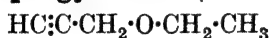
B.p. 156–8°. D_4^{20} 0.8759. Spar. sol. H_2O .
B₂H₂PtCl₆: orange leaflets. M.p. 173–4°.
B, HAuCl₄: m.p. 105°.

Ladenburg, *Ann.*, 1888, **247**, 72.

Ethylpiperidylamine.

See *N*-Ethylpiperidine.

Ethyl propargyl Ether (*Ethoxyallylene*)



C_5H_8O MW, 84

Liq. with penetrating odour. B.p. 80°. D_4^{20} 0.8326. n_D^{20} 1.40390. Completely miscible with $EtOH$.

Baeyer, *Ann.*, 1866, **138**, 196.

Liebermann, Kretschmer, *Ann.*, 1871, **158**, 230.

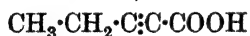
Ethylpropenylcarbinol.

See 2-Hexenol-4.

Ethyl propenyl Ketone.

See 2-Hexenone-4.

Ethylpropionic Acid (*1-Butine-1-carboxylic acid, 3-methyltetrollic acid*)



$C_5H_6O_2$ MW, 98

Cryst. M.p. 50°. Sol. H_2O .

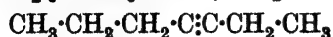
Et ester: $C_7H_{10}O_2$. MW, 126. B.p. 67–8°/18 mm. D_4^{20} 0.962.

Dupont, *Compt. rend.*, 1909, **148**, 1523.

Ethylpropylacetic Acid.

See 1-Ethyl-*n*-valeric Acid.

Ethylpropylacetylene (*3-Heptine*)



C_7H_{12} MW, 96

B.p. 105–6° (106–7°). D_4^{25} 0.7337. n_D 1.415.
 H_2SO_4 or $HCl \rightarrow$ butyrone. $HgCl_2 \rightarrow$ white ppt.

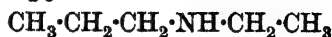
Lespieau, Wiemann, *Bull. soc. chim.*, 1929, **45**, 635.

Béhal, *Ann. chim.*, 1888, **15**, 415.

Faworski, *J. prakt. Chem.*, 1895, **51**, 558.

Bourguel, *Ann. chim.*, 1925, **3**, 191, 325.

Ethylpropylamine



$C_5H_{13}N$ MW, 87

B.p. 79.8°/747 mm. Sol. $EtOH$. Spar. sol. H_2O . D_4^{24} 0.773.

B, HCl: m.p. 225–6° (217–18°).

N-Nitroso: b.p. 195°.

B₂H₂PtCl₆: orange yellow cryst. M.p. 198–9° (184–5°). D_4^{16} 1.89.

B, HAuCl₄: m.p. 86–7°.

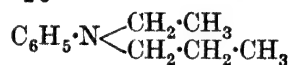
Comanducci, Arena, *Chem. Zentr.*, 1907, **II**, 1396.

Bewad, *J. prakt. Chem.*, 1901, **63**, 211.

Ethyl propylaminoformate.

See Propylurethane.

Ethylpropylaniline



$C_{11}H_{17}N$ MW, 163

Yellowish oil. B.p. 216°.

B, HCl: m.p. 131°.

Claus, Hirzel, *Ber.*, 1886, **19**, 2787.

Ethylpropylcarbinol (*Hexanol-3, 3-hydroxy-hexane*)



$C_6H_{14}O$ MW, 102

B.p. 134.5–135.5°. D_4^{20} 0.81825.

Allophanate: m.p. 185.5°.

Acid phthalate: m.p. 76–7°.

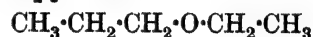
Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1942.

Lieben, Völker, *Ber.*, 1875, **8**, 1019.

Ethyl propyl Diketone.

See Heptandione-3 : 4.

Ethyl propyl Ether



$C_5H_{12}O$ MW, 88

B.p. 63.6°. D_4^{20} 0.7386. n_D^{20} 1.36948.

Cerchez, *Bull. soc. chim.*, 1928, **43**, 767.

Michael, Wilson, *Ber.*, 1906, **39**, 2574.

Brühl, *Ann.*, 1880, **200**, 177.

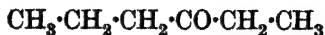
sym.-Ethylpropylethylene.

See 3-Heptene.

Ethylpropylethylene Glycol.

See Heptandiol-3 : 4.

Ethyl propyl Ketone (*Hexanone-3, 3-keto-hexane*)



$C_6H_{12}O$ MW, 100

B.p. 123–123.5°. D_4^{22} 0.81491. n_D^{22} 1.39899.

Oxime: b.p. 86°/17 mm.

Semicarbazone: m.p. 112°.

2:4-Dinitrophenylhydrazones: m.p. 130°.

Sabatier, Mailhe, *Compt. rend.*, 1913, **156**, 1733.

Lieben, Völker, *Ber.*, 1875, **8**, 1019.

Michael, *Ber.*, 1906, **39**, 2144.

Ethylpropylmalonic Acid (*Hexane-3:3-dicarboxylic acid*)



$\text{C}_8\text{H}_{14}\text{O}_4$ MW, 174

Needles. M.p. 117–18°. Sol. H_2O , EtOH, Et₂O. Insol. ligroin. $k = 1.16 \times 10^{-2}$ at 25°.

Di-Me ester: $\text{C}_{10}\text{H}_{18}\text{O}_4$. MW, 202. B.p. 215–17°.

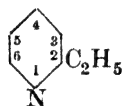
Di-Et ester: $\text{C}_{12}\text{H}_{22}\text{O}_4$. MW, 230. B.p. 234–6°.

Rasetti, *Bull. soc. chim.*, 1905, **33**, 684.

1-Ethyl-2-propylsuccinic Acid.

See Heptane-3:4-dicarboxylic Acid.

2-Ethylpyridine (α -Ethylpyridine)



$\text{C}_7\text{H}_9\text{N}$ MW, 107

B.p. 148.6° (148–50°). D^0 0.9502. D^{17} 0.9371.

$\text{B}, \text{HCl}, 2\text{HgCl}_2$: needles from H_2O . M.p. 103–6°.

$\text{B}_2, \text{H}_2\text{PtCl}_6$: orange plates. M.p. 165–7° decomp.

B, HAuCl_4 : yellow plates from H_2O . M.p. 121°.

Picrate: m.p. 187–9°.

Bergstrom, McAllister, *J. Am. Chem. Soc.*, 1930, **52**, 2848.

Löffler, Grosse, *Ber.*, 1907, **40**, 1327.

Königs, Happe, *Ber.*, 1902, **35**, 1345.

Ladenburg, *Ber.*, 1899, **32**, 44.

3-Ethylpyridine (β -Ethylpyridine).

B.p. 162–5°/762 mm. D^0 0.9539.

$\text{B}, \text{HCl}, 2\text{HgCl}_2$: m.p. 132–5°.

$\text{B}_2, \text{H}_2\text{PtCl}_6$: m.p. 208–9° (196°).

Picrate: m.p. 128–30°.

Ladenburg, *Ann.*, 1898, **301**, 151.

Königs, *Ann.*, 1906, **347**, 216.

4-Ethylpyridine (γ -Ethylpyridine).

B.p. 164–5°. D^0 0.9557. D^{20} 0.9417.

$\text{B}, \text{HCl}, 2\text{HgCl}_2$: plates. M.p. 150–2°.

$\text{B}_2, \text{H}_2\text{PtCl}_6$: plates. M.p. 213°.

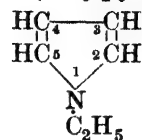
B, HAuCl_4 : prisms from HCl. M.p. 147–8° (145°).

Picrate: m.p. 168°.

Ladenburg, *Ber.*, 1899, **32**, 45.

Gabriel, Colman, *Ber.*, 1902, **35**, 1365.

N-Ethylpyrrole (*Ethylpyrrolylamine*)



$\text{C}_6\text{H}_9\text{N}$ MW, 95

B.p. 131°. D^{10} 0.9042, D^{16} 0.8881. Sol. EtOH, Et₂O. Insol. H_2O .

Ciamician, Zanetti, *Ber.*, 1889, **22**, 660.

Bell, Lapper, *Ber.*, 1877, **10**, 1962.

Lubavin, *Ber.*, 1869, **2**, 100.

2-Ethylpyrrole (α -Ethylpyrrole).

B.p. 163–5°, 59–60°/15 mm.

de Jong, *Rec. trav. chim.*, 1929, **48**, 1029.

Hess, Wissing, *Ber.*, 1914, **47**, 1424.

Dennstedt, *Ber.*, 1890, **23**, 2563.

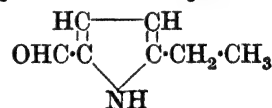
3-Ethylpyrrole (*Note*.—According to de Jong (*Rec. trav. chim.*, 1929, **48**, 1029) the 3-ethylpyrrole described in the literature (*refs. below*), is actually 2-ethylpyrrole).

B.p. 163–5°.

Oddo, Mameli, *Gazz. chim. ital.*, 1914, **44**, II, 169.

Dennstedt, Zimmermann, *Ber.*, 1886, **19**, 2190.

2-Ethylpyrrole-5-aldehyde

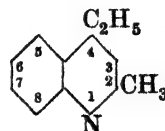


$\text{C}_7\text{H}_9\text{ON}$ MW, 123

Needles from ligroin. M.p. 52°.

Fischer, Beyer, Zaucker, *Ann.*, 1931, **486**, 68.

4-Ethylquinaldine (*2-Methyl-4-ethylquinoline*)



$\text{C}_{13}\text{H}_{13}\text{N}$ MW, 171

B.p. 150–3°/14 mm. $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 \rightarrow$ quinaldine-4-carboxylic acid.

Methiodide: m.p. 246°.

Tartrate: needles from EtOH. M.p. 149°.

Knoll, D.R.Ps., 363,582-3, (*Chem. Abstracts*, 1924, 18, 991).

Knövenagel, Bähr, *Ber.*, 1922, 55, 1926.

6-Ethylquinaldine (2-Methyl-6-ethylquinoline).

B.p. 276-9°.

Methiodide: yellow needles from EtOH. M.p. 214°.

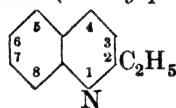
Dichromate: m.p. 134°.

HgCl₂ double salt: m.p. 155°.

ZnCl₂ double salt: m.p. 167°.

Mills, Harris, Lambourne, *J. Chem. Soc.*, 1921, 119, 1300.

2-Ethylquinoline (α -Ethylquinoline)



$C_{11}H_{11}N$ MW, 157

B.p. 245-6°, 128-31°/13 mm. D_4^{17} 1.050. n_D^{25} 1.5979. Sol. EtOH, Et₂O, CHCl₃, CS. Spar. sol. H₂O.

Methiodide: greenish-yellow needles from EtOH. M.p. 180°.

B_2, H_2PtCl_6 : m.p. 188°.

$B, HCl, HgCl_2$: needles. M.p. 118°.

$B, HCl, 2AuCl_3$: yellow needles. M.p. 142°.

Picrate: m.p. 148°.

Delaby, Hiron, *Bull. soc. chim.*, 1930, 47, 1395.

Döbner, *Ann.*, 1887, 242, 272.

Reher, *Ber.*, 1887, 20, 2734; 1886, 19, 2996.

3-Ethylquinoline (β -Ethylquinoline).

B.p. 135-8°/12 mm. D_4^{20} 1.0508. n_D^{18} 1.603.

B, HCl : m.p. 173°.

Methiodide: m.p. 191°.

Picrate: m.p. 197°.

v. Braun, Petzold, Seeman, *Ber.*, 1922, 55, 3785.

4-Ethylquinoline (γ -Ethylquinoline).

B.p. 271-4°, 143-5°/8-9 mm. $CrO_3 + H_2SO_4 \rightarrow$ cinchoninic acid.

B, HNO_3 : m.p. 120° (115.5°).

$B, HCl, HgCl_2$: needles. M.p. 154°.

B_2, H_2PtCl_6 : m.p. 204°.

Methiodide: yellow cryst. M.p. 149°.

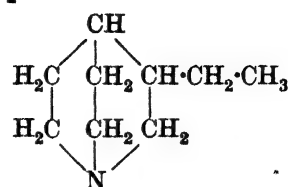
Picrate: yellow needles from H₂O. M.p. 178-80° decomp.

Reher, *Ber.*, 1886, 19, 2999; 1887, 20, 2734.

Rabe, Pasternack, *Ber.*, 1913, 46, 1032.

Dict. of Org. Comp.—II.

3-Ethylquinuclidine



$C_9H_{17}N$

MW, 139

Oil with odour resembling collidine. B.p. 190-92°/720 mm.

B, HCl : m.p. 208-11°.

B, HBr : m.p. 230-1°.

B, HI : m.p. 233°.

$B, HAuCl_4$: golden leaflets from EtOH.Aq. M.p. 176-8°.

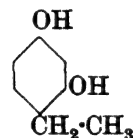
B_2, H_2PtCl_6 : m.p. 221° decomp.

Picrate: yellow needles from H₂O. M.p. 153-154.5°.

Koenigs, Bernhart, *Ber.*, 1905, 38, 3054.

Koenigs, *Ber.*, 1904, 37, 3244.

4-Ethylresorcinol (2 : 4-Dihydroxyethylbenzene)



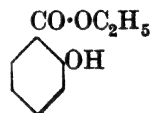
$C_8H_{10}O_2$

MW, 138

Cryst. from H₂O. M.p. 97-8°.

Johnson, Lane, *J. Am. Chem. Soc.*, 1921, 43, 356.

Ethyl salicylate



$C_9H_{10}O_3$

MW, 166

M.p. 1.3°. B.p. 231.5°, 132.8°/37 mm., 107.5-108.5°/12 mm., 101.8°/8.8 mm. D_4^{18} 1.147, D_2^{20} 1.131. n_D^{20} 1.5226. Heat of comb. C_p 1051.748 Cal.

Me ether: see under o-Methoxybenzoic Acid.

Et ether: see under o-Ethoxybenzoic Acid.

Acetyl: see under Acetylsalicylic Acid.

Benzoyl: leaflets from EtOH. M.p. 79-80°.

p-Nitrobenzoyl: yellowish leaflets from C_6H_6 . M.p. 107-8°.

Phenylcarbamate: m.p. 98-100°.

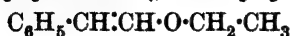
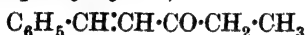
Göttig, *Ber.*, 1876, 9, 1473.

Baly, *Ann.*, 1849, 70, 270.

Auwers, *Ann.*, 1915, 408, 253.

α -Ethylstilbene.

See 1 : 2-Diphenylbutylene-1.

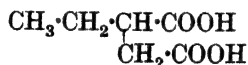
Ethyl styryl Ether (β -Ethoxystyrene) $\text{C}_{10}\text{H}_{12}\text{O}$ MW, 148B.p. 223–6°, 106°/14 mm., 98–9°/10 mm.
 D_4^{20} 0.979. n_D^{20} 1.5496.Wislicenus, Bilhuber, *Ber.*, 1918, 51, 1370.Duffraisie, Chaux, *Bull. soc. chim.*, 1926, 39, 905.**Ethyl styryl Ketone (Benzylidenemethyl ethyl ketone, β -propionylstyrene)** $\text{C}_{11}\text{H}_{12}\text{O}$ MW, 160Leaflets from ligroin. M.p. 38–9°. B.p. 142°/12 mm. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. n_D^{20} 1.5726.

Oxime : m.p. 85–6°.

Semicarbazone : m.p. 173°.

Phenylhydrazone : m.p. 104–5° (101°).

Dibromide : m.p. 109–10°.

Harries, Müller, *Ber.*, 1902, 35, 968.**Ethylsuccinic Acid (Butane-1 : 2-dicarboxylic acid)** $\text{C}_6\text{H}_{10}\text{O}_4$ MW, 146Needles. M.p. 100°. Sol. H₂O, EtOH, Et₂O. Spar. sol. CHCl₃. Insol. pet. ether. Heat of comb. C_p 671.9 Cal. k (first) = 8.5×10^{-5} at 25° : (second) = 1.3×10^{-6} at 100°. Dist. \rightarrow anhydride.*Di-Me ester* : C₈H₁₄O₄. MW, 174. B.p. 202–5°. D_{24}^{24} 1.051.*Di-Et ester* : C₁₀H₁₈O₄. MW, 202. B.p. 223–6° (230–1°). D_{21}^{21} 1.030.*Anhydride* : C₆H₈O₃. MW, 128. Liq. D^{24} 1.165.*Diamide* : C₆H₁₂O₂N₂. MW, 144. M.p. 214°.Fittig, Fränkel, *Ann.*, 1889, 255, 41.Polko, *Ann.*, 1887, 242, 121.Huggenberg, *Ann.*, 1878, 192, 149.**Ethyl sulphate.**

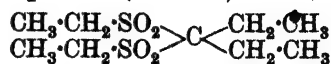
See Diethyl sulphate and Ethyl hydrogen sulphate

Ethyl sulphide.

See Diethyl sulphide.

Ethyl sulphite.

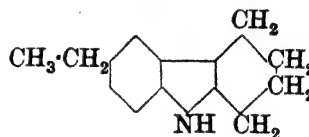
See Diethyl sulphite and Ethyl hydrogen sulphite.

Ethylsulphonal (Tetronal) $\text{C}_9\text{H}_{20}\text{O}_4\text{S}_2$ MW, 256M.p. 85°. Sol. 450 parts cold H₂O. More sol. EtOH, Et₂O. Hypnotic.Baumann, Kast, *Z. physiol. Chem.*, 1890, 14, 64.**Ethylsulphonic Acid.**

See Ethanesulphonic Acid.

Ethylsulphuric Acid.

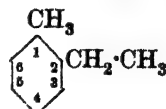
See Ethyl hydrogen sulphate.

6-Ethyl-1 : 2 : 3 : 4-tetrahydrocarbazole $\text{C}_{14}\text{H}_{17}\text{N}$ MW, 199Plates from ligroin. M.p. 78°. S \rightarrow 3-ethylcarbazole.Plant, Williams, *J. Chem. Soc.*, 1934, 1143.**N-Ethyl-1 : 2 : 3 : 4-tetrahydroquinoline.**

See Kairoline A.

Ethyltetramethylene Glycol.

See Hexandiol-1 : 4.

Ethyl thiocyanate $\text{C}_3\text{H}_5\text{NS}$ MW, 87B.p. 146°. D_4^{16} 1.020, D_4^{25} 1.00715. n_D^{15} 1.4684. Misc. with EtOH, Et₂O. Insol. H₂O. Heat of comb. C_p 612.5 Cal., C_p 613.8 Cal. Polymerises on heating to 190° with trace of acid. Zn + HCl \rightarrow C₂H₅SH + HCN.Billmann, Bjerrum, *Ber.*, 1917, 50, 509.Walden, *Ber.*, 1907, 40, 3215.Palazzo, Scelsi, *Gazz. chim. ital.*, 1908, 38, I, 669.***o*-Ethyltoluene (1-Methyl-2-ethylbenzene)** C_9H_{12} MW, 120B.p. 164.8–165°, 62–3°/20–1 mm. D_4^{17} 0.8841, D_4^{20} 0.881. n_D^{20} 1.5042. Dil. HNO₃ \rightarrow *o*-toluic acid.Auwers, *Ann.*, 1919, 419, 109.Blaise, Montagne, *Compt. rend.*, 1925, 181, 122.

m-Ethyltoluene

m-Ethyltoluene (1-Methyl-3-ethylbenzene).

B.p. 161.5–162.5°. D_4^{20} 0.867. n_D^{20} 1.4975. $\text{CrO}_3 \rightarrow$ isophthalic acid.

Auwers, *Ann.*, 1919, **419**, 110.

Bartow, Sellards, *J. Am. Chem. Soc.*, 1905, **27**, 370.

p-Ethyltoluene (1-Methyl-4-ethylbenzene).

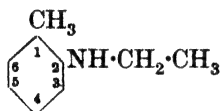
B.p. 161–2°. D_4^{20} 0.862. n_D^{20} 1.4943. Dil. $\text{HNO}_3 \rightarrow$ *p*-toluic acid. $\text{CrO}_3 \rightarrow$ terephthalic acid.

Wallach, *Ann.*, 1917, **414**, 210.

Defren, *Ber.*, 1895, **28**, 2649.

See also first reference above.

N-Ethyl-o-toluidine



$\text{C}_9\text{H}_{13}\text{N}$

MW, 135

B.p. 214–214.5°. D_4^{25} 0.948.

N-Acetyl: *N*-ethylacet-*o*-toluidide. B.p. 254–6°.

Finzi, *Chem. Abstracts*, 1925, **19**, 2648.

Thomas, *J. Chem. Soc.*, 1917, **111**, 563.

Reinhardt, Staedel, *Ber.*, 1883, **16**, 29.

N-Ethyl-m-toluidine.

B.p. 221–2° (215°).

B, *HCl*: m.p. 159°.

B, *HBr*: m.p. 161°.

B, *HI*: m.p. 138°.

Chloroplatinate: m.p. 182° decomp.

B, *HgCl*₂: m.p. 88°.

B, *ZnCl*₂: m.p. 128°.

N-Acetyl: *N*-ethylacet-*m*-toluidide. B.p. 254°.

N-Benzoyl: m.p. 72°.

N-Oxalyl: m.p. 111°.

Yamaguchi, Matsumoto, *Chem. Abstracts*, 1924, **18**, 3192.

See also first reference above.

N-Ethyl-p-toluidine.

B.p. 217°. $D^{15.5}$ 0.9391, D_4^{25} 0.942.

Guyot, Fournier, *Bull. soc. chim.*, 1930, **47**, 209.

Finzi, *Chem. Abstracts*, 1925, **19**, 2648.

Lazier, Adkins, *J. Am. Chem. Soc.*, 1924, **46**, 741.

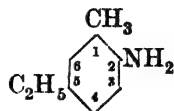
Thomas, *J. Chem. Soc.*, 1917, **111**, 570.

Morley, Abel, *Ann.*, 1855, **93**, 313.

51

Ethyl p-tolyl Ketone

5-Ethyl-o-toluidine (2-Methyl-4-ethylaniline, 6-amino-1-methyl-3-ethylbenzene)



$\text{C}_9\text{H}_{13}\text{N}$

MW, 135

Colourless liq., darkening on exposure to air or light. B.p. 228–9°.

B, *HCl*: m.p. 152°.

N-Formyl: m.p. 151°.

N-Acetyl: m.p. 105°.

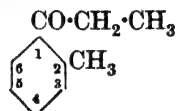
N-Benzoyl: m.p. 152°.

Mailhe, *Bull. soc. chim.*, 1921, **29**, 715.

Ethyl tollyl Ether.

See under Cresol.

Ethyl o-tolyl Ketone (2-Methylpropio-phenone, 2-propionyltoluene)



$\text{C}_{10}\text{H}_{12}\text{O}$

MW, 148

B.p. 219–20°. D_4^0 1.0119.

Semicarbazone: m.p. 173° (169°).

Mauthner, *J. prakt. Chem.*, 1922, **103**, 393.

Senderens, *Ann. chim.*, 1913, **28**, 332.

Blaise, *Compt. rend.*, 1901, **133**, 1218.

Ethyl m-tolyl Ketone (3-Methylpropio-phenone, 3-propionyltoluene).

B.p. 234°/745 mm. D_4^0 1.0059.

Oxime: m.p. 68–9°.

Semicarbazone: m.p. 175–6° (166°).

Wallach, Rentschler, *Ann.*, 1908, **360**, 61.

See also second reference above.

Ethyl p-tolyl Ketone (4-Methylpropio-phenone, 4-propionyltoluene).

B.p. 238–9°, 119–20°/18 mm., 106°/8 mm. D_4^0 1.0053, D_4^{20} 0.990. n_D^{20} 1.5278.

Oxime: m.p. 89–90°.

Semicarbazone: m.p. 186.5–187° (180°).

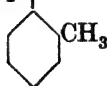
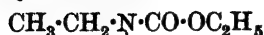
Mauthner, *J. prakt. Chem.*, 1922, **103**, 394.

Noller, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 1893.

Senderens, *Ann. chim.*, 1913, **28**, 332.

Auwers, *Ber.*, 1916, **49**, 2400.

Klages, *Ber.*, 1902, **35**, 2252.

Ethyl-o-tolylurethane $\text{C}_{12}\text{H}_{17}\text{O}_2\text{N}$

MW, 207

B.p. 257°/755 mm. D_{25}^{25} 1.0225.Baker, *J. Chem. Soc.*, 1913, 103, 1657.**Ethyltridecylcarbinol (Hexadecanol-3, 3-hydroxyhexadecane)** $\text{C}_{16}\text{H}_{34}\text{O}$

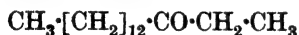
MW, 242

l.

Needles from EtOH. M.p. 50°. B.p. 152°/4 mm. D_4^{20} 0.8000. $[\alpha]_D^{20}$ - 5.27° in EtOH. Spar. volatile in steam.*Acid phthalate*: needles from pet. ether. M.p. 51°. $[\alpha]_D^{20}$ - 16.47° in EtOH.

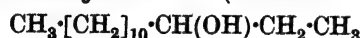
dl.

M.p. 37-8°. B.p. 176°/16 mm.

Acid phthalate: needles from pet. ether. M.p. 51-2°.Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1952.**Ethyl tridecyl Ketone (Hexadecanone-3)** $\text{C}_{16}\text{H}_{32}\text{O}$

MW, 240

Leaflets from pet. ether. M.p. 42°. B.p. 184°/17 mm.

Semicarbazone: cryst. from EtOH.Aq. M.p. 86°.Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1952.**Ethylundecylcarbinol (Tetradecanol-3)** $\text{C}_{14}\text{H}_{30}\text{O}$

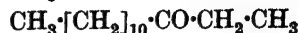
MW, 214

l.

Prisms from EtOH. M.p. 38°. B.p. 160°/15 mm., 146°/10 mm. D_4^{20} 0.8098. $[\alpha]_D^{20}$ - 6.25° in EtOH. Slowly volatilises in steam.*Acid phthalate*: needles from pet. ether. M.p. 33°. $[\alpha]_D^{20}$ - 17.43° in EtOH.

dl.

Needles. M.p. 25°. B.p. 173°/25 mm.

Acid phthalate: cryst. from pet. ether. M.p. 58-60°.Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1950.**Ethyl undecyl Ketone (Tetradecanone-3)** $\text{C}_{14}\text{H}_{28}\text{O}$

MW, 212

Cryst. from MeOH. M.p. 34°. B.p. 152°/16 mm., 148°/10 mm.

Oxime: cryst. from MeOH. M.p. 40°.*Semicarbazone*: cryst. from EtOH. M.p. 89°.Blaise, Guérin, *Bull. soc. chim.*, 1903, 29, 1208.

See also above reference.

Ethylurea $\text{C}_3\text{H}_8\text{ON}_2$

MW, 88

Needles from EtOH-Et₂O. M.p. 92°. Very sol. H₂O, EtOH, CHCl₃, C₆H₆. Insol. Et₂O, CS₂. Hot alc. KOH → K cyanate + ethylamine.*Nitrate*: prisms. M.p. 55-60°.*Oxalate*: plates. M.p. 55-60°.Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, 51, 1797.Kjellin, Kuylenstjerna, *Ann.*, 1897, 298, 119.**Ethylurethane (Ethyl N-ethyl carbamate, ethyl ethylaminoformate)** $\text{C}_5\text{H}_{11}\text{O}_2\text{N}$

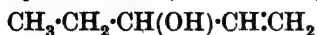
MW, 117

B.p. 170° (174-6°), 74-5°/14 mm. D_4^{20} 0.9813. n_D^{20} 1.42192. Hot alkali → C₂H₅OH, CO₂, and C₂H₅NH₂.Mauguin, *Ann. chim. phys.*, 1911, 22, 323.Curtius, Hille, *J. prakt. Chem.*, 1901, 64, 409.Schreiner, *J. prakt. Chem.*, 1880, 21, 125.**1-Ethyl-n-valeric Acid (Ethylpropylacetic acid, hexane-3-carboxylic acid)** $\text{C}_7\text{H}_{14}\text{O}_2$

MW, 130

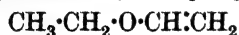
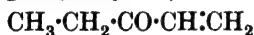
B.p. 209.2°. Sol. EtOH, Et₂O. Prac. insol. H₂O. Heat of comb. C₇ 994.7 Cal.*Me ester*: C₈H₁₆O₂. MW, 144. B.p. 155-156.5°.*Et ester*: C₉H₁₈O₂. MW, 158. B.p. 169-71°.*Chloride*: C₇H₁₃OCl. MW, 148.5. B.p. 158-60°.*Amide*: C₇H₁₅ON. MW, 129. Cryst. from CS₂. M.p. 102.5-103.5°.Rasetti, *Bull. soc. chim.*, 1905, 33, 685.Kiliani, *Ber.*, 1886, 19, 227.**Ethylvinylacetone.**

See 1-Heptenone-4.

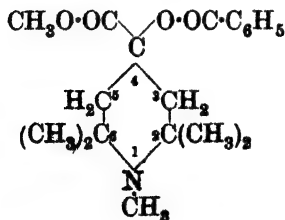
Ethylvinylcarbinol (1-Pentenol-3)C₅H₁₀O MW, 86B.p. 114–16°, 37°/20 mm. D₄²⁰ 0.856, D₄²⁵ 0.839. n_D²⁰ 1.4182.

p-Nitrobenzoyl: m.p. 53°.

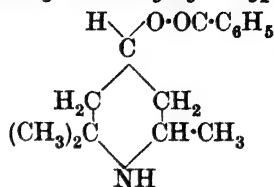
Allophanate: m.p. 155°.

Delaby, *Compt. rend.*, 1922, 175, 967.Kohler, *Am. Chem. J.*, 1907, 38, 525.**Ethyl vinyl Ether (Ethoxyethylene)**C₄H₈O MW, 72B.p. 35.5°. D₄²⁰ 0.7589. n_D²⁰ 1.3856. Spar. sol. H₂O. Polymerises violently on addn. of iodine.I.G., D.R.Ps., 550,403, 550,495, (*Chem. Abstracts*, 1932, 26, 4825).Leuchs, *Lemcke, Ber.*, 1914, 47, 2577.**Ethyl vinyl Ketone (1-Pentenone-3, 3-ketopentene-1, propionylethylene)**C₅H₈O MW, 84Liq. with penetrating odour. B.p. 68–70°/200 mm., 38°/60 mm. D₄¹⁵ 0.8524. n_D¹⁵ 1.4275. Sol. most org. solvents. Insol. H₂O. Polymerises easily, especially by heat or alkali. Forms add. comps. with aliphatic and aromatic amines.Diethylacetal: C₉H₁₈O₂. MW, 158. B.p. 76–8°/15 mm.Blaise, Maire, *Bull. soc. chim.*, 1908, 3, 270.Courtot, Pierron, *Compt. rend.*, 1929, 188, 1501.**Ethylxanthogenic Acid.**

See Xanthogenic Acid.

α-Eucaine (1 : 2 : 2 : 6 : 6 - Pentamethyl-4-benzoylhydroxypiperidine-4-carboxylic acid methyl ester)C₁₉H₂₇O₄N MW, 333M.p. 104–5° (103°). Sol. H₂O, Et₂O, CHCl₃, C₆H₆, pet. ether. Local anæsthetic.

Hydrochloride: m.p. about 200° decomp.

Parsons, *J. Am. Chem. Soc.*, 1901, 23, 885.
Schering, D.R.P., 90,245.**β-Eucaine** (o-Benzoylvinyldiacetonealkamine 2 : 6 : 6-trimethyl-4-benzoylhydroxypiperidine)C₁₅H₂₁O₂N MW, 247

l.

Prisms from pet. ether. M.p. 57–8°.

B,HCl: plates. M.p. 244–5°. [α]_D – 11.3° in H₂O.

Picrate: prisms from EtOH. M.p. 198–9°.

d.

Columns from pet. ether. M.p. 57–8°. Equally anæsthetic to the l-form but only half as toxic.

B,HCl: plates. M.p. 244–5°. [α]_D + 11.5° in H₂O.

r.

Plates from pet. ether. M.p. 70–1° (91°, about 78°). Sol. Et₂O, CHCl₃, C₆H₆, pet. ether. Substitute for cocaine as local anæsthetic.

B,HCl: m.p. 277–9° (268° decomp.).

Picrate: plates from EtOH. M.p. 230–5–231.5°.

King, *J. Chem. Soc.*, 1924, 125, 41.Parsons, *J. Am. Chem. Soc.*, 1901, 23, 885.

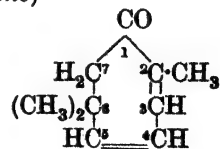
Schering, D.R.P., 97,672.

Eucalyptol.

See Cineole.

Eucarvol.

See Eucarvone.

Eucarvone (Eucarvol, 2 : 6 : 6-trimethyl-Δ^{2:4}-cycloheptadienone)C₁₀H₁₄O MW, 150Oil with odour resembling menthone. B.p. 99–100°/22 mm., 88°/10 mm. D₄²⁰ 0.9490. n_D²⁰ 1.50872. Does not form bisulphite comp. Isomerises to carvacrol on boiling.

Oxime: cryst. from MeOH. M.p. 106°.

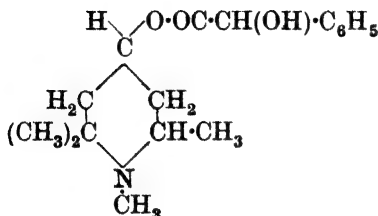
Semicarbazone : m.p. 186–8° (183–4°).

Wallach, Köhler, *Ann.*, 1905, **339**, 94.

Clarke, Lapworth, *J. Chem. Soc.*, 1910, **97**, 15.

Baeyer, Villiger, *Ber.*, 1898, **31**, 2068.

Eucatropine (*Euphthalmine*, *betacaine mandelate*)



$C_{17}H_{25}O_3N$ MW, 291

Prisms from pet. ether. M.p. 113° (sinters at 108°). Sol. H_2O , EtOH, $CHCl_3$. Insol. Et_2O . Mydriatic.

B, HCl : m.p. 183–4°.

$B, HAuCl_4$: m.p. 158–9°.

Salicylate: m.p. 115–16°.

Kipping, *J. Chem. Soc.*, 1923, **123**, 3115.

Harries, *Ber.*, 1898, **31**, 665; *Ann.*, 1897, **296**, 341.

Schering, D.R.P., 95,620, (*Chem. Zentr.*, 1898, I, 968).

Eucazulene

$C_{15}H_{18}$ MW, 198

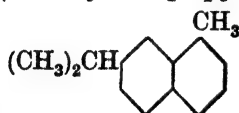
B.p. 135°/0.5 mm.

Picrate: m.p. 118–20°.

Styphnate: m.p. 122–3°.

Ruzicka, Rudolph, *Helv. Chim. Acta*, 1926, **9**, 133.

Eudalene (1-Methyl-7-isopropyl-naphthalene)



$C_{14}H_{16}$ MW, 184

B.p. 140°/11 mm.

Picrate: needles from EtOH. M.p. 92°.

Styphnate: needles from EtOH. M.p. 119–20°.

Ruzicka, Meyer, Mingazzini, *Helv. Chim. Acta*, 1922, **5**, 361.

Ruzicka, Stoll, *ibid.*, 923.

Barnett, Sanders, *J. Chem. Soc.*, 1933, **435**.

Eudesmene

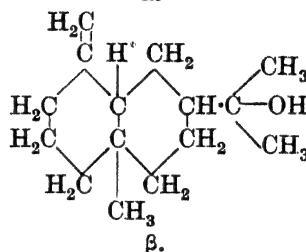
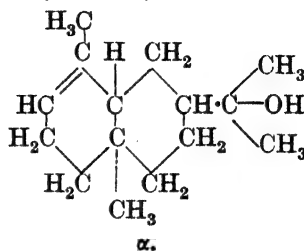
$C_{15}H_{24}$ MW, 204

B.p. 135–6°/14 mm. D_4^{20} 0.9232. n_D^{20} 1.5099. $[\alpha]_D^{20} + 51^\circ$.

Dihydrochloride: m.p. 74–5° (79–80°). $[\alpha]_D + 20^\circ \pm 3^\circ$.

Ruzicka, Wind, Koolhaas, *Helv. Chim. Acta*, 1931, **14**, 1140.

Eudesmol (*Selinelol*)



$C_{15}H_{26}O$ MW, 222

Constituent of various eucalyptus oils. Mixture of α - and β -forms. M.p. 82–3°. B.p. 156°/10 mm. D_4^{20} 0.9884. n_D^{20} 1.516°. $[\alpha]_D + 31.3^\circ$ in $CHCl_3$. $AcOH-HCl \rightarrow$ eudesmene dihydrochloride.

Acetyl: b.p. 165–70°/11 mm. D_4^{20} 0.9933. n_D^{20} 1.49204. $[\alpha]_D^{20} + 31^\circ$.

Dibromide: m.p. 55–6°.

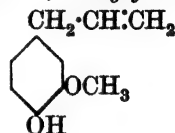
Allophanate: m.p. 174°.

Ruzicka, Wind, Koolhaas, *Helv. Chim. Acta*, 1931, **14**, 1132.

Ruzicka, Capato, *Ann.*, 1927, **453**, 62.

Semmler, Tobias, *Ber.*, 1913, **46**, 2026.

Eugenol (4-Hydroxy-3-methoxyallylbenzene, 2-methoxy-4-allylphenol, 5-allylguaiacol)



$C_{10}H_{12}O_2$ MW, 164

Chief constituent of clove oil and present in many other essential oils. B.p. 254° (248°), 127°/15 mm., 123°/12 mm. D_4^{20} 1.0620. n_D^{19} 1.5439. Sol. EtOH, Et_2O , AcOH, caustic alkalis. Spar. sol. H_2O . Alkaline $KMnO_4 \rightarrow$ vanillin. Boiling alc. KOH \rightarrow isoeugenol.

Me ether: 3:4-dimethoxy-1-allylbenzene, methyleugenol, 4-allylveratrole. $C_{11}H_{14}O_2$.

MW, 178. Present in many essential oils. B.p. 248-9° (244°), 128-9°/11 mm. D^{16}_D 1.055. n^{20}_D 1.532.

Et ether: 3-methoxy-4-ethoxy-1-allylbenzene. $C_{12}H_{16}O_2$. MW, 192. B.p. 254°. D^{16}_D 1.0117. Polymerises on heating or dist. \rightarrow product, leaflets from EtOH, m.p. 140° (125°).

Acetyl: see Aceteugenol.

Benzoyl: m.p. 70.5° (69-70°).

p-Nitrobenzoyl: m.p. 81°.

3:5-Dinitrobenzoyl: m.p. 130.8°.

Phenylcarbamate: m.p. 95.5°.

Claisen, Kremers, *Ann.*, 1919, 418, 113.

Wassermann, *Ann.*, 1875, 179, 366.

Luff, Perkin, Robinson, *J. Chem. Soc.*, 1910, 97, 1138.

Moureu, *Bull. soc. chim.*, 1896, 15, 651.

Euonymol

$C_{21}H_{30}O_4$ MW, 346

Isolated from root bark of *Euonymus atropurpureus*, Jacquin. Prisms. M.p. 248-50°.

Acetyl deriv.: prisms. M.p. 215°.

Rogerson, *J. Chem. Soc.*, 1912, 101, 1046.

Euonysterol

$C_{31}H_{52}O_2$ MW, 456

Isolated from root bark of *Euonymus atropurpureus*, Jacquin. M.p. 137-8°. $[\alpha]_D -28.2^\circ$.

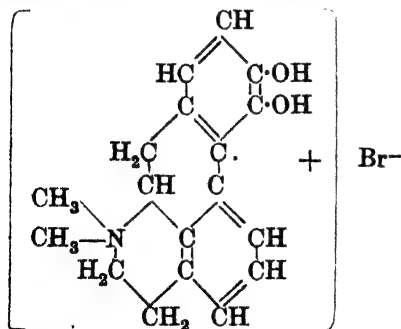
Acetyl deriv.: laminæ. M.p. 116-18°.

Rogerson, *J. Chem. Soc.*, 1912, 101, 1047.

Euphthalmine.

See Eucatropine.

Eupophine (*Apomorphine methobromide*)



$C_{18}H_{20}O_2NBr$ MW, 362

Needles from MeOH. M.p. 180°. Sol. H_2O , EtOH. Insol. Et_2O .

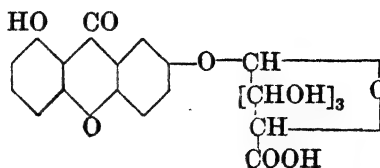
Pschorr, D.R.P., 158,620, (*Chem. Zentr.*, 1905, I, 703).

Riedel, D.R.P., 167,879, (*Chem. Zentr.*, 1906, I, 1067).

Euresol.

See under Resorcinol.

Euxanthic Acid



$C_{19}H_{16}O_{10}$

MW, 404

Exists as stable hydrate with $1H_2O$. M.p. 156-8° part. decomp.

Me ester: $C_{20}H_{18}O_{10}$. MW, 418. M.p. 212°.

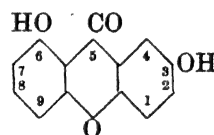
Et ester: $C_{21}H_{20}O_{10}$. MW, 432. M.p. 198°.

Robertson, Waters, *J. Chem. Soc.*, 1931, 1709.

Neuberg, Neimann, *Z. physiol. Chem.*, 1905, 44, 114.

Graebe, *Ber.*, 1900, 33, 3360.

Euxanthone (3:6-Dihydroxyxanthone)



$C_{13}H_8O_4$

MW, 228

Occurs in *Platonia insignis*, Mart., *Mangnifera indica*, Linn., etc. Yellowish needles from toluene. M.p. 240°. Sol. hot EtOH, conc. alkalis. Spar. sol. Et_2O . Insol. H_2O . Sublimes with part. decomp. $FeCl_3 \rightarrow$ green col. KOH fusion \rightarrow hydroquinone + resorcinol. Forms stable Na, Ca, Ba, Mg, etc. salts.

6-Me ether: $C_{14}H_{10}O_4$. MW, 242. Pale yellow plates from C_6H_6 . M.p. 235° (240°).

3-Me ether: yellow plates from EtOH. M.p. 130.5°.

Di-Me ether: $C_{15}H_{12}O_4$. MW, 256. Needles from ligroin. M.p. 149.5°.

Di-Et ether: $C_{17}H_{16}O_4$. MW, 284. M.p. 126°.

3-Acetyl: yellowish prisms from EtOH. M.p. 160°.

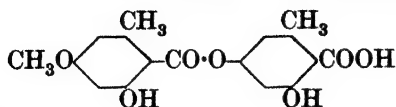
Diacetyl: yellowish prisms from C_6H_6 . M.p. 185°.

Dibenzoyl: yellow cryst. M.p. 221-2° (214°).

Robertson, Waters, *J. Chem. Soc.*, 1929, 2239.

Ullmann, Panchaud, *Ann.*, 1906, 350, 108.

Graebe, Aders, *Ann.*, 1902, 318, 365.

Evernic Acid (*Lecanoric acid methyl ether*) $C_{17}H_{16}O_7$

MW, 332

Constituent of various lichens. Prisms from EtOH. M.p. 170° . Sol. hot EtOH. Spar. sol. cold EtOH, Et_2O . Insol. cold H_2O .

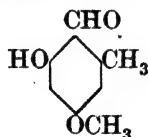
Diacetyl: prisms from AcOEt-ligroin. M.p. 159° (144°).

Me ester: $C_{16}H_{18}O_7$. MW, 346. Prisms from Me_2CO . M.p. 148° .

Et ester: $C_{19}H_{20}O_7$. MW, 360. Prisms from EtOH. M.p. 152° .

Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1388.

Hesse, *J. prakt. Chem.*, 1898, 57, 246.

Everninaldehyde (*3-Hydroxy-5-methoxy-o-toluic aldehyde, 6-hydroxy-2-methylanisaldehyde*) $C_9H_{10}O_3$

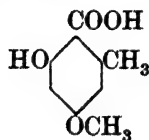
MW, 166

Prisms from 70% MeOH. M.p. 65° .

Acetyl: prisms from ligroin. M.p. 84° .

Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1390.

Hoesch, *Ber.*, 1913, 46, 889.

Evernicic Acid (*6-Hydroxy-2-methylanisic acid, orsellinic acid 5-methyl ether, 3-hydroxy-5-methoxy-o-toluic acid*) $C_9H_{10}O_4$

MW, 182

Needles from H_2O . M.p. 170° (157°). Sol. EtOH, Me_2CO , AcOEt. Spar. sol. Et_2O , C_6H_6 , ligroin.

Et ester: $C_{11}H_{14}O_4$. MW, 210. Prisms from EtOH. M.p. 72° .

Me ether: 3:5-dimethoxy-o-toluic acid.

$C_{10}H_{12}O_4$. MW, 196. Prisms from EtOH.Aq. M.p. 140° decomp.

Et ether: $C_{11}H_{14}O_4$. MW, 210. Prisms from AcOEt-ligroin. M.p. 87° .

Acetyl: prisms from AcOEt-ligroin. M.p. 117° (111°).

Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1392.

Hesse, *J. prakt. Chem.*, 1915, 92, 425.

Hoesch, *Ber.*, 1913, 46, 892.

Fischer, Hoesch, *Ann.*, 1912, 391, 367.

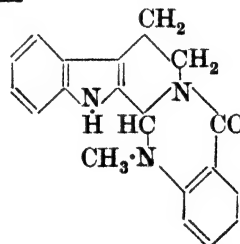
Evipan (*N-Methylcyclohexenylmethylbarbituric acid, N-methylcyclohexenylmethylmalonyl ureide*).

Tasteless cryst. powder. M.p. $143-5^\circ$. Sol. AcOEt, hot EtOH. Spar. sol. H_2O , Et_2O . Hypnotic.

Na salt: intravenous anæsthetic of short duration (15-20 mins.).

Weese, Scharpff, *Chem. Zentr.*, 1932, II, 2330.

Mayer, *ibid.*, 2078.

Evodiamin $C_{19}H_{17}ON_3$

MW, 303

Occurs in fruit of *Evodia rutaecarpa*, Benth. and Hook. Leaflets from EtOH. M.p. 278° . $[\alpha]_D^{25} + 352^\circ$ in Me_2CO . Sol. Me_2CO . Spar. sol. EtOH, Et_2O , AcOH, $CHCl_3$. Insol. H_2O , C_6H_6 , pet. ether. Weak base, insol. dil. acids. Alc. $HCl \rightarrow$ inactive isoevodiamin, $C_{19}H_{19}O_2N_3$, m.p. $146-7^\circ$.

Asahina, Ohta, *Ber.*, 1928, 61, 319.

Asahina, Ishio, Kashiwagi, Mayeda, Fujita, *Chem. Zentr.*, 1923, III, 249.

Asahina, Fujita, *Chem. Zentr.*, 1922, I, 357.

Exalgin.

See *N*-Methylacetanilide.

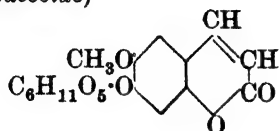
Exaltolide.

See under 15-Hydroxypentadecylic Acid.

Exaltone.

See Cyclopentadecanone.

Fabiatrin (7-Glucosido-6-methoxycoumarin, scopoletin glucoside)



$C_{18}H_{18}O_9$ MW, 354

Present in leaves of *Fabiana imbricata*, Ruiz. et Pav. Needles + $2H_2O$ from H_2O . M.p. $226-8^\circ$. Sol. hot H_2O . Spar. sol. cold org. solvents. Hyd. \rightarrow glucose + scopoletin.

Edwards, Rogerson, *Biochem. J.*, 1927, 21, 1010.

F-Acid.

See 2-Naphthol-7-sulphonic Acid.

Fæcosterol

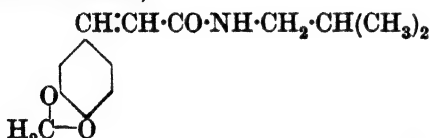
$C_{27}H_{46}O$ MW, 386

Needles from Me_2CO . M.p. $161-3^\circ$. $[\alpha]_D^{25} + 42.1^\circ$ in $CHCl_3$. Sol. Et_2O , $CHCl_3$, $AcOEt$, C_6H_6 , pet. ether. Spar. sol. $EtOH$, Me_2CO . Acetyl deriv.: leaflets from $EtOH$. M.p. $159-61^\circ$.

Benzoyl deriv.: m.p. $144-6^\circ$. $[\alpha]_D^{25} + 35.4^\circ$ in $CHCl_3$.

Wieland, Asano, *Ann.*, 1929, 473, 307.

Fagaramide (N-Isobutyl-3:4-methylenedioxy-cinnamic amide)



$C_{14}H_{17}O_3N$ MW, 247

Occurs in bark of *Zanthoxylum macrophyllum*, Oliver. Plates from $AcOEt$. M.p. 119.5° (softens at 105°). $KMnO_4 \rightarrow$ piperonal \rightarrow piperonylic acid. Alc. $KOH \rightarrow$ methylenedioxy-cinnamic acid + isobutylamine.

B_3HCl : m.p. 137° .

Dibromide: m.p. $134-5^\circ$.

Goodson, *Biochem. J.*, 1921, 15, 123.

Thoms, Thumen, *Ber.*, 1911, 44, 3717.

Fagarol

$C_{20}H_{30}O_6$ MW, 354

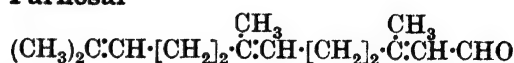
Sterol occurring in root of *Zanthoxylum senegalense*, D.C. Needles from C_6H_6 -pet. ether.

F

M.p. $127-8^\circ$. Sol. C_6H_6 , $CHCl_3$, Me_2CO , CS_2 . Spar. sol. $EtOH$, pet. ether.

Preiss, *Chem. Zentr.*, 1911, II, 94.

Farnesal



$C_{15}H_{24}O$ MW, 220

B.p. $172-4^\circ/14$ mm. $D^{18} 0.893$. $n_D^{20} 1.49951$. Reduces $NH_3 \cdot AgNO_3$.

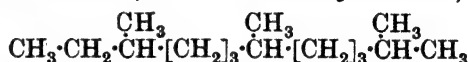
Semicarbazone: m.p. $133-5^\circ$.

Naef, D.R.P., 469,555, (*Chem. Abstracts*, 1929, 23, 1724).

Kerschbaum, *Ber.*, 1913, 46, 1734.

Ruzicka, *Helv. Chim. Acta*, 1923, 6, 502.

Farnesane (2:6:10-Trimethyldodecane)



$C_{15}H_{32}$ MW, 212

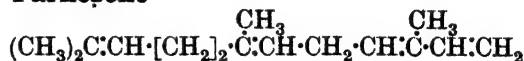
B.p. $126.5^\circ/15$ mm., $119.5-120^\circ/11$ mm. Spar. sol. $MeOH$, $AcOH$. $D_4^{20} 0.7682$. $n_D^{20} 1.4303$.

Kuhn, Ehmman, *Helv. Chim. Acta*, 1929, 12, 906.

Fischer, *Ann.*, 1928, 464, 88.

Fischer, Löwenberg, *Ann.*, 1929, 475, 193.

Farnesene



$C_{15}H_{24}$ MW, 204

Mobile oil. B.p. $129-32^\circ/12$ mm. $D_4^{20} 0.8410$. $n_D^{20} 1.4836$.

Ruzicka, *Helv. Chim. Acta*, 1923, 6, 498.

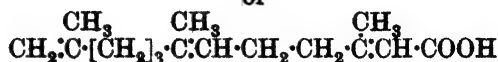
Kerschbaum, *Ber.*, 1913, 46, 1733.

Harries, Haarmann, *ibid.*, 1741.

Farnesenic Acid (2:6:10-Trimethyl-undeca-1:5:9-triene carboxylic acid, or 2:6:10-trimethyl undeca-1:5:10-triene carboxylic acid)



or



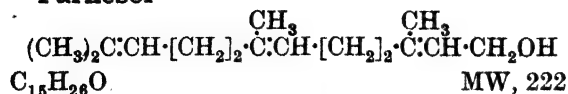
$C_{15}H_{24}O_2$ MW, 236

B.p. $202-6^\circ/16$ mm.

Me ester: $C_{16}H_{26}O_2$. MW, 250. B.p. 177–185°/10 mm.

Kerschbaum, *Ber.*, 1913, **46**, 1735.

Farnesol



Occurs in many essential oils such as acacia, neroli, musk, and especially in oil from *Hibiscus abelmoschus*, Linn. B.p. 160°/10 mm., 149°/4 mm. (140–1°/3–4 mm.). D_4^{20} 0.8846. n_D^{20} 1.4877. $CrO_3 \rightarrow$ farnesal.

Acetyl: farnesyl acetate. B.p. 169–70°/10 mm.

Ruzicka, *Helv. Chim. Acta*, 1926, **6**, 492.

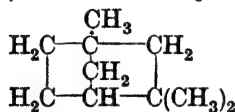
Gresjean, Martinet, *Chem. Abstracts*, 1926, **20**, 93 (Review).

Fischer, *Ann.*, 1928, **464**, 74, 87 (Bibl.).

Naef, D.R.P., 469,555, (*Chem. Abstracts*, 1929, **23**, 1724).

Nivière, *Chem. Abstracts*, 1925, **19**, 2258 (Review).

Fenchane (1 : 3 : 3-Trimethylnorcamphane)



$C_{10}H_{18}$ MW, 138

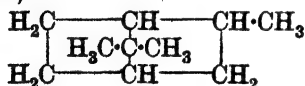
Liq. at -15° . B.p. 151–2°/765 mm. Sol. EtOH, Et₂O. Spar. sol. AcOH. D_4^{20} 0.8345. n_D^{20} 1.44714. $[\alpha]_D - 18^\circ$.

Wolff, *Ann.*, 1912, **394**, 86.

Komppa, Hasselström, *Ann.*, 1932, **496**, 164 (Bibl.).

Kondakov, *Chem. Abstracts*, 1930, **24**, 2453.

α-Fenchene (2 : 7 : 7-Trimethylnorcamphane, isobornylene)



$C_{10}H_{18}$ MW, 138

B.p. 163.5–164.5°/753 mm. D_4^{20} 0.8579. n_D^{20} 1.4590. $[\alpha]_D - 12.36^\circ$.

Komppa, Hasselström, *Ann.*, 1932, **496**, 164.

Nametkin, *Ann.*, 1924, **440**, 60.

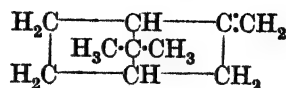
Fenchelene

$C_{10}H_{16}$ MW, 136

B.p. 175–8°, 66–70°/20 mm. D_4^{20} 0.842. n_D^{20} 1.47439.

Wallach, *Ann.*, 1898, **300**, 311.

α-Fenchene



$C_{10}H_{16}$ MW, 136

l.

B.p. 157–9° (155–60°). D_4^{20} 0.8670 (0.8665). n_D^{20} 1.47133. $[\alpha]_D^{20} - 32.32^\circ$.

dl-. Isopinene.

B.p. 154–6°. D_4^{20} 0.8660, n_D^{20} 1.4705.

Hydrochloride: m.p. 35–7°.

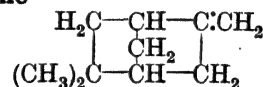
Wallach, *Ann.*, 1891, **263**, 149.

Nametkin, Abahumowsky, Seliwanoff, *Ann.*, 1924, **440**, 66.

Komppa, Hasselström, *Ann.*, 1932, **496**, 165.

Komppa, Roschier, *Chem. Abstracts*, 1917, **11**, 3276.

β-Fenchene



$C_{10}H_{16}$ MW, 136

d.

B.p. 150.5–153.5° (152–4°). D_4^{20} 0.8599 (0.8597). n_D^{20} 1.46511. $[\alpha]_D^{20} + 62.5^\circ$.

Dibromide: m.p. 81–2°.

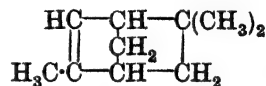
Nitroschloride: m.p. 120°.

Komppa, Hasselström, *Ann.*, 1932, **496**, 165; 1933, **502**, 272.

Komppa, Beckmann, *Ann.*, 1933, **503**, 130.

Quist, *Ann.*, 1918, **417**, 278.

γ-Fenchene



$C_{10}H_{16}$ MW, 136

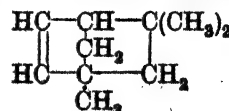
B.p. 145–7°. D_4^{20} 0.8539. n_D^{20} 1.46063.

Nitroschloride: m.p. 150° decomp.

Kondakov, *Chem. Abstracts*, 1929, **23**, 2707.

Komppa, Hasselström, *Ann.*, 1932, **496**, 156.

δ-Fenchene (Isopfenchene, fenchylene)



$C_{10}H_{16}$ MW, 136

B.p. 139–40°. D_4^{20} 0.8433 (0.8381). n_D^{20} 1.44862 (1.4494). $[\alpha]_D - 68.8^\circ$ in EtOH.

Nitrosochloride: m.p. 131°.

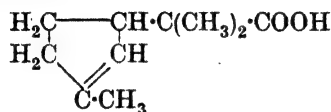
See last reference above and also

Nametkin, *J. prakt. Chem.*, 1923, 106, 25.

Fenchol.

See Fenchyl Alcohol.

α -Fencholenic Acid (*Methylcyclopentenyl-isobutyric acid*)



$\text{C}_{10}\text{H}_{16}\text{O}_2$

MW, 168

d.-

Viscous oil. B.p. 254–6° decomp., 136–8°/12 mm. D^{16} 1.0069. $[\alpha]_D + 32.35^\circ$.

Amide: $\text{C}_{10}\text{H}_{17}\text{ON}$. MW, 167. Leaflets from EtOH. M.p. 113–14°. $[\alpha]_D + 28.82^\circ$ in EtOH.

Nitrile: $\text{C}_{10}\text{H}_{15}\text{N}$. MW, 149. B.p. 217–18° (211–12°). D^{20} 0.9005 (0.898). $[\alpha]_D + 43.3^\circ$.

Nitrosochloride: m.p. 123–4°.

l.-

Amide: m.p. 114–15°.

dl.-

Amide: m.p. 98–9°.

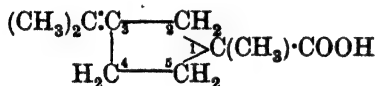
Wallach, *Ann.*, 1893, 272, 105, 108; 1911, 381, 75.

Blumann, Zeitschel, *Ber.*, 1909, 42, 2702.

Cockburn, *J. Chem. Soc.*, 1899, 75, 502.

Semmler, Bartelt, *Ber.*, 1907, 40, 435.

β -Fencholenic Acid (*1-Methyl-3-isopropylidenecyclopentane-1-carboxylic acid*)



$\text{C}_{10}\text{H}_{16}\text{O}_2$

MW, 168

Cryst. from pet. ether. M.p. 72–3° (68°). B.p. 259–60°, 140.5–141.5°/12 mm. Sol. EtOH, Et_2O . Spar. sol. C_6H_6 , AcOH. D_4^{18} 0.9638. $[\alpha]_D^{19} + 25.85^\circ$ in Et_2O .

Me ester: $\text{C}_{11}\text{H}_{18}\text{O}_2$. MW, 182. B.p. 97–9°. D^{22} 0.9608. n_D^{20} 1.46459.

Amide: $\text{C}_{10}\text{H}_{17}\text{ON}$. MW, 167. M.p. 86.5–87.5°. Sol. EtOH, Et_2O .

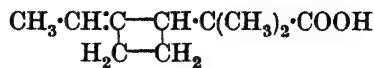
Nitrile: $\text{C}_{10}\text{H}_{15}\text{N}$. MW, 149. B.p. 217–19°. $D^{15.6}$ 0.9203. $[\alpha]_D + 43.66^\circ$ in EtOH.

Cockburn, *J. Chem. Soc.*, 1899, 75, 501.

Wallach, *Ann.*, 1911, 379, 205.

Semmler, *Ber.*, 1906, 39, 2854.

γ -Fencholenic Acid (*Ethylidenecyclobutylisobutyric acid*)



Probable structure

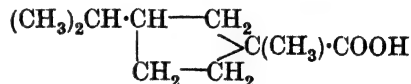
$\text{C}_{10}\text{H}_{16}\text{O}_2$

MW, 168

Oil. B.p. 151–3°/18 mm., 145–6°/10 mm. Sol. Et_2O . D^{20} 1.0087. n_D^{20} 1.47838. $[\alpha]_D + 52.3^\circ$. Readily changes to α -fencholenic acid.

Semmler, *Ber.*, 1907, 40, 434, 440.

Fencholic Acid (*1-Methyl-3-isopropylcyclopentane-1-carboxylic acid, dihydro- β -fencholenic acid*)



$\text{C}_{10}\text{H}_{18}\text{O}_2$

MW, 170

d.-

F.p. 18.8°. M.p. 18–19°. B.p. 255–9°, 162–5°/22 mm., 119–20°/1 mm. D_4^{19} 0.9698. n_D^{20} 1.4563. Spar. volatile in steam.

Me ester: $\text{C}_{11}\text{H}_{20}\text{O}_2$. MW, 184. B.p. 91°/12 mm. D^{22} 0.9295.

Et ester: $\text{C}_{12}\text{H}_{22}\text{O}_2$. MW, 198. B.p. 222–3°, 97°/10 mm. D^{20} 0.9129. n_D^{20} 1.43958.

Chloride: $\text{C}_{10}\text{H}_{17}\text{OCl}$. MW, 188.5. B.p. 218–19°/750 mm., 105°/20 mm., 100°/15 mm. D^{20} 1.0045. n_D^{20} 1.4606. $[\alpha]_D^{19} - 2.43^\circ$.

Anhydride: $\text{C}_{20}\text{H}_{34}\text{O}_3$. MW, 322. B.p. 205–10°/20 mm.

Amide: $\text{C}_{10}\text{H}_{19}\text{ON}$. MW, 169. F.p. 95.3°. M.p. 94°. B.p. 160°/11 mm.

Nitrile: $\text{C}_{10}\text{H}_{17}\text{N}$. MW, 151. B.p. 217–18°. D^{20} 0.8680. n_D^{20} 1.4426.

l.-

F.p. 16–18°. B.p. 144–5°/13 mm. $[\alpha]_D^{20} - 3.66^\circ$.

Et ester: b.p. 115–17°/25 mm. $[\alpha]_D^{20} - 3.753^\circ$.

Chloride: b.p. 118–19°/24 mm.

Amide: m.p. 94°.

dl.-

Amide: m.p. 116° (108°). Sol. EtOH, Et_2O , C_6H_6 .

Maxwell, *Ann. chim.*, 1922, 17, 341.

Wallach, *Ann.*, 1911, 379, 198, 213.

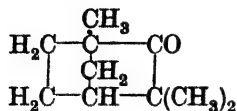
Bouveault, Levallois, *Bull. soc. chim.*, 1910, 7, 684, 966, 971.

Semmler, *Ber.*, 1906, 39, 2579.

Barbier, Grignard, *Bull. soc. chim.*, 1909, 5, 522.

Braun, Jakob, *Ber.*, 1933, 66, 1463.

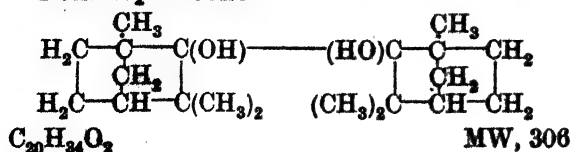
Fenchone

 $\text{C}_{10}\text{H}_{16}\text{O}$

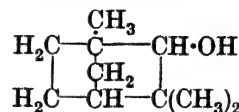
MW, 152

d-.
Occurs in essential oil of *Lavandula Stoechas*,
Linn. F.p. 5-6°. M.p. 3-5°. B.p. 193-5°,
122°/100 mm., 82°/20 mm., 68-3°/10 mm. D_4^{20}
0.9465. n_D^{20} 1.4623. $[\alpha]_D^{20} + 63.03^\circ$.
Hydrazone: m.p. 56-7°. B.p. 230-1° decomp.
 $[\alpha]_D + 46.4^\circ$ in EtOH.
d-(or *l*)- α -Oxime: m.p. 165°. *Benzoyl deriv.*:
m.p. 79°. $[\alpha]_D \pm 29^\circ$.
d-(or *l*)- β -Oxime: m.p. 123°. $[\alpha]_D \pm 129.3^\circ$
in EtOH. *Benzoyl deriv.*: m.p. 123°. $[\alpha]_D$
 $\pm 120^\circ$.
d-(or *l*)-2:4-Dinitrophenylhydrazone: m.p.
140°. Sinters at 125°. *Azine*: m.p. 106-7°.
l-.
M.p. 5° (8.5°). B.p. 192-4°. D_4^{20} 0.948.
 $[\alpha]_D^{20} - 66.94^\circ$ in EtOH.
Semicarbazone: m.p. 182-3°.
dl-.
M.p. -18 to -16°. B.p. 192-3° (193-4°),
72-3°/12 mm. D_4^{20} 0.9501. n_D^{20} 1.4702.
 α -Oxime: m.p. 158-9°. *Benzoyl deriv.*: m.p.
77°.
 β -Oxime: m.p. 129°. *Benzoyl deriv.*: m.p.
111-15°.
Semicarbazone: m.p. 172-3°.
Phenylhydrazone: b.p. 202-3°/18 mm.
Braun, Jakob, *Ber.*, 1933, 66, 1462.
Zeitschel, Todenhöfer, *J. prakt. Chem.*,
1932, 133, 376.
Bouveault, Levallois, *Bull. soc. chim.*,
1916, 7, 963, 968.
Roure-Bertrand Fils, *Chem. Abstracts*,
1922, 16, 2577.
Ruzicka, *Ber.*, 1917, 50, 1362 (*Bibl.*).
Maxwell, *Ann. chim.*, 1922, 17, 332.
Delépine, *Bull. soc. chim.*, 1924, 35, 1330.
Ruzicka, *Ann.*, 1924, 440, 322.
Humphrey, U.S.P., 1,850,983, (*Chem.*
Abstracts, 1932, 26, 2752): U.S.P.,
1,876,454, (*Chem. Zentr.*, 1933, I, 848).
du Pont, F.P., 736,087, (*ibid.*, 1352).

Fenchopinacone

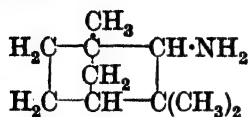
 $\text{C}_{20}\text{H}_{34}\text{O}_2$

MW, 306

d-.
Cryst. from EtOH or AcOH. M.p. 97°. B.p.
360-5° decomp., 219-20°/13 mm. $[\alpha]_D^{20} + 45^\circ$ in
AcOEt.
l-.
 $[\alpha]_D^{20} - 44.78^\circ$ in AcOEt.
dl-.
M.p. 104-5°.
Wallach, Wienhaus, *Ann.*, 1909, 369, 68.
Fenchyl Alcohol (*Fenchol*, 1 : 3 : 3-trimethyl-
bicyclo-[1 : 2 : 2]-heptanol-2) $\text{C}_{10}\text{H}_{18}\text{O}$

MW, 154

d-.
M.p. 45°. B.p. 201-2°. $[\alpha]_D + 10.36^\circ$ in
EtOH.
Acetyl: *d*-fenchyl acetate. B.p. 125-7°/5 mm.
Phenylurethane: m.p. 82-82.5°.
Acid phthalate: m.p. 145-145.5°.
Oxalyl deriv.: cryst. from EtOH. M.p. 92-3°.
 $[\alpha]_D^{20} + 48.24^\circ$ in C_6H_6 .
l-.
Prisms. M.p. 47°. B.p. 94°/20 mm. D_4^{20}
0.9641. $[\alpha]_{5461} - 15.04^\circ$.
p-Chlorobenzoyl deriv.: m.p. 73-4°.
p-Nitrobenzoyl deriv.: m.p. 108-9°.
Acid phthalate: m.p. 146°.
Phenylurethane: m.p. 82°.
l- β -.
M.p. 3-4°. B.p. 91°/18 mm. $[\alpha]_{5461} - 27.97^\circ$.
p-Nitrobenzoyl deriv.: m.p. 82-3°.
Acid phthalate: m.p. 153°.
dl-.
M.p. 38-90° (37-8°). B.p. 201-4° (202-3°).
Phenylurethane: m.p. 104°.
Formyl deriv.: m.p. 21°. B.p. 207-8°. D_4^{20}
0.996. n_D^{20} 1.46092.
Acetyl: *dl*-fenchyl acetate. F.p. -0.5°. B.p.
79°/15 mm.
Oxalyl deriv.: m.p. 100.5-101.5°.
Acid phthalate: m.p. 169-169.5°.
Kenyon, Priston, *J. Chem. Soc.*, 1925,
127, 1472.
Zeitschel, Todenhöfer, *J. prakt. Chem.*,
1932, 133, 374.
Smith, U.S.P., 1,887,171, (*Chem. Zentr.*,
1933, I, 1017).
Nametkin, Seliwanoff, *J. prakt. Chem.*,
1923, 106, 28.

Fenchylamine (2-Aminofenchane) $\text{C}_{10}\text{H}_{19}\text{N}$

MW, 153

*d.*N-Benzylidene: m.p. 42°. $[\alpha]_D^{19} - 62.1^\circ$ in MeOH.

N-Salicylidene: m.p. 95°.

*l.*B.p. 195°. $D^{20} 0.9095$. $[\alpha]_D^{95} - 24.89^\circ$.N-Formyl: m.p. 114°. $[\alpha]_D^{11} - 36.95^\circ$ in CHCl_3 .N-Acetyl: m.p. 98°. $[\alpha]_D^{25} - 46.62^\circ$ in CHCl_3 .

N-Oxalyl: N:N'-difenchyloxamide. M.p. 188°.

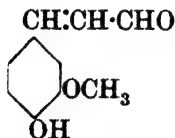
N-Benzoyl: m.p. 133-5°.

N-Benzylidene: m.p. 42°. $[\alpha]_D^{19} + 73.23^\circ$ in CHCl_3 .N-Salicylidene: m.p. 95°. $[\alpha]_D^{16} + 66.59^\circ$ in CHCl_3 . Me ether: m.p. 56°. $[\alpha]_D^{19} + 58.98^\circ$ in CHCl_3 .N-4-Hydroxybenzylidene: m.p. 175°. $[\alpha]_D^{19} + 72.00^\circ$ in CHCl_3 . Me ether: m.p. 54-5°. $[\alpha]_D^{11} + 78.10^\circ$ in CHCl_3 .*dl.*

N-Salicylidene: m.p. 64-5°.

Wallach, Binz, *Ann.*, 1893, 276, 318.Wallach, *Ann.*, 1893, 272, 105.**Fenchylene.**See δ -Fenchene.**Ferrobilin.**

See under Glauco bilin.

Ferula-aldehyde (*p-Coniferyl aldehyde*, 4-hydroxy-3-methoxycinnamaldehyde) $\text{C}_{10}\text{H}_{10}\text{O}_3$

MW, 178

Decomp. product of lignin.

Cis: (α -).

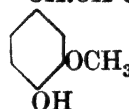
Unstable. Only obtained as polymer.

Trans: (β -).Cryst. from C_6H_6 . M.p. 82.5°. B.p. 157°/2.5 mm.

Semicarbazone: m.p. 218°.

Hillmer, Hellriegel, *Ber.*, 1929, 62, 725.Klason, *Ber.*, 1930, 63, 912.**Ferulene** $\text{C}_{15}\text{H}_{26}$

MW, 206

Occurs in essential oil from *Dorema ammoniacum*, D. Don. and many *Ferula* species. B.p. 124-6°/0.7 mm. $D^{20} 0.8698$. $n_D^{20} 1.48423$. $[\alpha]_D^{30} + 6^\circ$. $\text{H} \rightarrow$ tetrahydroferulene, b.p. 118-22°/10 mm.Semmler, Jonas, Roenisch, *Ber.*, 1917, 50, 1826.Roenisch, *Chem. Abstracts*, 1921, 15, 2282.**Ferulic Acid** (4-Hydroxy-3-methoxycinnamic acid, caffeic acid 3-methyl ether) $\text{CH}:\text{CH}:\text{COOH}$  $\text{C}_{10}\text{H}_{10}\text{O}_4$

MW, 194

Occurs in *asafoetida* as free acid. Prisms or needles from H_2O . M.p. 168-9° (170°). Sol. EtOH, AcOEt, hot H_2O . Mod. sol. Et_2O . Spar. sol. C_6H_6 , ligroin.Me ester: $\text{C}_{11}\text{H}_{12}\text{O}_4$. MW, 208. M.p. 63-4°. B.p. 202°/11 mm. Acetyl deriv.: m.p. 124°.Et ester: $\text{C}_{12}\text{H}_{14}\text{O}_4$. MW, 222. Cryst. + H_2O . M.p. 75.5-76.5°.Propyl ester: $\text{C}_{13}\text{H}_{16}\text{O}_4$. MW, 236. Cryst. + H_2O . M.p. 78-9°.

Acetyl: m.p. 196-7°.

Carbomethoxyl: m.p. 186-7°. Chloride: m.p. 147°.

Posner, *J. prakt. Chem.*, 1910, 82, 434.Pacsu, Stieber, *Ber.*, 1929, 62, 2977.Tanaka, *Chem. Abstracts*, 1930, 24, 2453.Dutt, *J. Indian Chem. Soc.*, 1925, 1, 297.Fischer, Hoesch, *Ann.*, 1912, 391, 357.**Ferulic Aldehyde.**

See Ferula-aldehyde.

Fichtelite $\text{C}_{18}\text{H}_{32}$ ($\text{C}_{19}\text{H}_{34}$)

MW, 248 (262)

Constituent of *Pinus pumilio*, Haenke, and peat. M.p. 46.5°. B.p. 355°/719 mm., 235-6°/43 mm. Sol. CHCl_3 , ligroin. Spar. sol. EtOH. $D^{20} 0.9380$. $n_D^{20} 1.5052$. $[\alpha]_D^{20} + 19.00^\circ$ in CHCl_3 . $\text{S} \rightarrow$ retene.Ruzicka, Balas, Schinz, *Helv. Chim. Acta*, 1923, 6, 692 (*Bibl.*).**Ficoceryl Alcohol** $\text{C}_{17}\text{H}_{36}\text{O}$

MW, 268

Occurs as ester of ficocerylic acid in wax of

Ficus ceriflua, Jungh. Cryst. from EtOH. M.p. 198°.

Greshoff, Sack, *Rec. trav. chim.*, 1901, **20**, 65.

Ficocerylic Acid

$C_{13}H_{26}O_2$ MW, 214

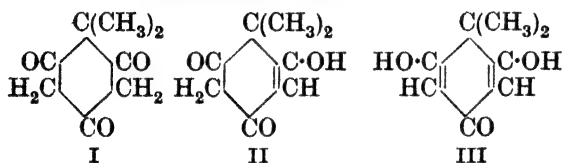
Occurs as ficoceryl ester in wax of *Ficus ceriflua*, Jungh. Cryst. from EtOH. M.p. 57°.

See previous reference.

Filicic Acid.

See Filicinic Acid.

Filicinic Acid (2:4:6-Triketo-1:1-dimethylcyclohexane, 1:1-dimethylcyclohexane-2:4:6-trione, gem-dimethylphloroglucinol)



$C_8H_{10}O_3$

MW, 154.

Triketo form (I):

Occurs in male fern extract. Cryst. from EtOH. M.p. 213–15° decomp. Mod. sol. hot H_2O , hot EtOH. Spar. sol. Et_2O , AcOH. Reduces Tollen's reagent.

Monoenol form (II):

Me ether: $C_9H_{12}O_3$. MW, 168. Prisms from AcOEt. M.p. 205–7° (208°). B.p. 194–6°/18 mm. Mod. sol. EtOH. Spar. sol. Et_2O , C_6H_6 , hot H_2O . Insol. pet. ether. $FeCl_3 \rightarrow$ reddish-violet col.

Et ether: $C_{10}H_{14}O_3$. MW, 182. Prisms from hot EtOH. M.p. 215°. $FeCl_3 \rightarrow$ reddish-purple col.

Dienol form (III):

Di-Et ether: $C_{12}H_{18}O_3$. MW, 210. Plates or prisms from hot pet. ether. M.p. 103–5°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. hot H_2O .

Diacetyl: m.p. 82–5°.

Dichloride: $C_8H_8OCl_2$. MW, 191. M.p. 79–80°.

Boehm, *Ann.*, 1899, **307**, 249.

Robertson, Sandrock, *J. Chem. Soc.*, 1933, 1617.

Filixic Acid

$C_{35}H_{40}O_{12}$

MW, 652

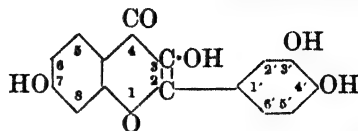
Occurs in male fern extract. Yellow plates from AcOEt. M.p. 184–5°. Sol. $CHCl_3$, CS_2 . Mod. sol. C_6H_6 , xylene. Spar. sol. Et_2O .

Boehm, *Ann.*, 1901, **318**, 253.

Firpene.

See Pinene.

Fisetin (3:7:3':4'-Tetrahydroxyflavone)



$C_{15}H_{10}O_6$

MW, 286

Colouring matter obtained from *Rhus* species. M.p. 330°.

3:3':4'-Tri-Me ether: $C_{18}H_{16}O_6$. MW, 328. Needles from AcOEt. M.p. 220°. *Acetyl deriv.*: m.p. 229°.

7:3':4'-Tri-Me ether: yellow needles. M.p. 186–7°. *Acetyl deriv.*: m.p. 167°.

Tetra-Me ether: $C_{19}H_{18}O_6$. MW, 342. Needles from AcOEt. M.p. 180°.

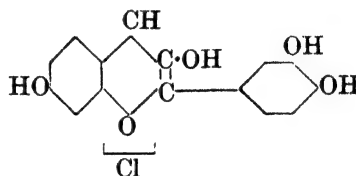
Tetra-acetyl deriv.: m.p. 201·5° (196–8°).

Auwers, Pohl, *Ber.*, 1915, **48**, 85 (*Bibl.*).

Allan, Robinson, *J. Chem. Soc.*, 1926, 2334.

Gerngross, Hübner, *Ber.*, 1927, **60**, 2094.

Fisetinidin chloride



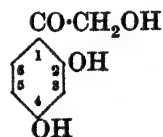
$C_{15}H_{11}O_5Cl$

MW, 306·5

Reddish-brown needles with violet sheen. M.p. above 220°. Alc. $FeCl_3 \rightarrow$ blue col. Alkalies \rightarrow blue sols.

Pratt, Robinson, *J. Chem. Soc.*, 1925, **127**, 1136.

Fisetol (2:4-Dihydroxyphenacyl alcohol, ω :2:4-trihydroxyacetophenone, ω -hydroxyresacetophenone)



$C_8H_8O_4$

MW, 168

Prisms from HCl.Aq. M.p. 189°.

ω -Me ether: $C_9H_{10}O_4$. MW, 182. M.p. 136°.

p-Nitrophenylhydrazine: m.p. 205° decomp.

4-Me ether: m.p. 128°. *Diacetyl deriv.*: m.p. 86°.

ω :4-Di-Me ether: $C_{10}H_{12}O_4$. MW, 196.

M.p. 66–8°. *Et ether*: $C_{12}H_{16}O_4$. MW, 224. M.p. 60–2° (67–8°).

2:4-Di-Me ether: m.p. 131°. *Phenylhydrazone*: m.p. 212°. *Et ether*: m.p. 56–7°. *Acetyl deriv.*: m.p. 75°.

Tri-Me ether: ω :2:4-trimethoxyacetophenone. $C_{11}H_{14}O_4$. MW, 210. M.p. 61–2°.

ω -*Et ether*: $C_{10}H_{12}O_4$. MW, 196. M.p. 136–7°.

ω :4-Di-Et ether: $C_{12}H_{16}O_4$. MW, 224. M.p. 42–4°. *Oxime*: m.p. 105–7°.

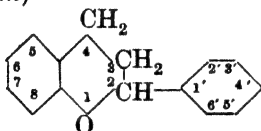
Tri-Et ether: ω :2:4-triethoxyacetophenone. $C_{14}H_{20}O_4$. MW, 252. M.p. 66–8°.

ω -*Phenyl ether*: phenyl 2:4-dihydroxyphenacyl ether, ω :2:4-dihydroxybenzoylanisole. $C_{14}H_{12}O_4$. MW, 244. M.p. 204–5° (sinters at 200°). 2:4-Di-Me ether: $C_{16}H_{16}O_4$. MW, 272. M.p. 115° (118–5°). B.p. 260–4°/18 mm.

Triacetyl: m.p. 129°. *Phenylhydrazone*: m.p. 109° decomp.

Nierenstein, Wang, Warr, *J. Am. Chem. Soc.*, 1924, **46**, 2551 (*Bibl.*).

Flavan (2-Phenyl-2:3-dihydrobenzopyran, 2-phenylchroman)



$C_{15}H_{14}O$ MW, 210

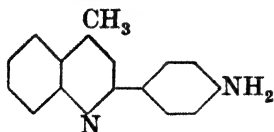
Cryst. from MeOH. M.p. 44–5°. Sol. ord. org. solvents.

Harries, Busse, *Ber.*, 1896, **29**, 380.

Flavandione-3:4.

See Flavonol.

Flavaniline (4-Methyl-2-[p-aminophenyl]-quinoline, p-aminoflavoline, 2-p-aminophenylepidine)



$C_{16}H_{14}N_2$ MW, 234

Prisms from C_6H_6 . M.p. 97°. Spar. sol. H_2O . Sol. EtOH.

N-Acetyl: m.p. 162–3°.

Fischer, *Ber.*, 1886, **19**, 1038.

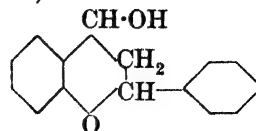
Goldschmidt, *Chem.-Ztg.*, 1903, **27**, 279.

M.L.B., D.R.P., 19,766.

Baum, D.R.P., 27,948.

Majert, D.R.P., 28,323.

Flavanol (4-Hydroxyflavan, 4-hydroxy-2-phenylchroman)



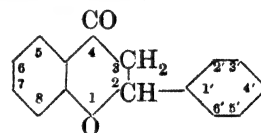
$C_{15}H_{14}O_2$ MW, 226

Cryst. from 30% EtOH. M.p. 119°. Sol. EtOH, $CHCl_3$, C_6H_6 , Me_2CO . Mod. sol. Et_2O , ligroin.

Acetyl: m.p. 85–6°.

Freudenberg, Orthner, *Ber.*, 1922, **55**, 1748.

Flavanone (2-Phenyl-2:3-dihydrobenz- γ -pyrone, 2-phenylchromanone)



$C_{15}H_{12}O_2$ MW, 224

Needles from ligroin. M.p. 76°.

3-Benzylidene deriv.: m.p. 103–4°.

3-Anisylidene deriv.: m.p. 148–9°.

3-Piperonylidene deriv.: m.p. 155–6°.

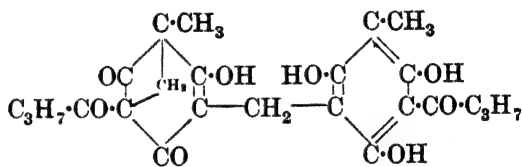
3-Vanillylidene deriv.: m.p. 92–4°.

Ryan, Creuss-Callaghan, *Chem. Abstracts*, 1930, **24**, 4037.

Löwenbein, *Ber.*, 1924, **57**, 1515.

See also previous reference.

Flavaspidic Acid (*Polystichocitrin*)



Probable structure

$C_{24}H_{28}O_8$ MW, 444

Occurs in male fern extract.

α -Form:

Cryst. from MeOH. M.p. 92°. Solidifies on heating further and remelts at 150°.

β -Form:

Cryst. from C_6H_6 or AcOH. M.p. 156°. $FeCl_3$ in EtOH \rightarrow deep red col. Reduces Tollen's reagent.

Diacyl deriv.: m.p. 142–3°.

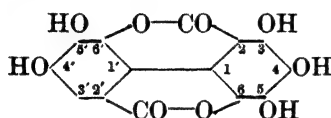
Boehm, *Ann.*, 1903, **320**, 310; 1901, **318**, 253.

Flavaspidin.

Constituent of *Filix mas* extract. Cryst. from AcOEt. M.p. 199°. Sol. C_6H_6 , $CHCl_3$, AcOEt, Me_2CO , amyl alcohol. Spar. sol. EtOH, Et_2O , MeOH, pet. ether, CS_2 . Possibly identical with phloraspidin, *q.v.*

Kraft, *Chem. Zentr.*, 1902, II, 533.

Flavellagic Acid (3 : 4 : 5 : 6 : 4' : 5' : 6' : Heptahydroxydiphenyl - 2 : 2' - dicarboxylic acid - 2 : 6' : 2' : 6-dilactone)



$C_{14}H_6O_9$

MW, 318.

Pale yellow prisms. M.p. above 360°. Spar. sol. ord. org. solvents. Alkalis \rightarrow green sols.

4 : 5 : 4' : 5' - Tetra-Me ether : $C_{18}H_{14}O_9$. MW, 374. Yellow needles from AcOH. M.p. 270-1°. 3-Acetyl : m.p. 237-8°.

3 : 4 : 5 : 4' : 5' - Penta-Me ether : $C_{19}H_{16}O_9$. MW, 388. Yellow cryst. from AcOH. M.p. 242°.

Penta-acetyl : m.p. 317-19°. Zn dust dist. \rightarrow fluorene.

Penta-benzoyl : m.p. 287-9°.

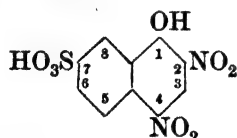
Perkin, *J. Chem. Soc.*, 1906, **89**, 251.

Perkin, Perkin, *J. Chem. Soc.*, 1908, **93**, 1195.

Flaveanic Acid.

See Cyanothioformamide.

Flavianic Acid (2 : 4-Dinitro-1-naphthol-7-sulphonic acid, Naphthol Yellow S)



$C_{10}H_6O_5N_2S$

MW, 314

Yellow needles from HCl.Aq. M.p. 151°. Forms ppts. with many org. bases.

Methylamine salt : decomp. at 265-8°.

Dimethylamine salt : decomp. at 230-5°.

Trimethylamine salt : decomp. at 217-23°.

Ethylenediamine salt : decomp. at 265-7°.

Trimethylhydroxylamine salt : decomp. at 215-19°.

Tetramethylammonium hydroxide salt : decomp. at 259°.

Isoamylamine salt : m.p. 215-17°.

Cadaverine salt : decomp. at 268-73°.

Putrescine salt : decomp. at 260-4°.

Betaine salt : decomp. at 229°.

Galegine salt : m.p. 159°.

Arginine salt : blackens above 200°. De-comp. at 275°.

Sievers, Müller, *Chem. Abstracts*, 1929, **23**, 4702.

Kossel, Gross, *Z. physiol. Chem.*, 1924, **135**, 167.

Felix, Dirr, *Z. physiol. Chem.*, 1928, **176**, 38.

Müller, *Chem. Abstracts*, 1932, **26**, 4792.

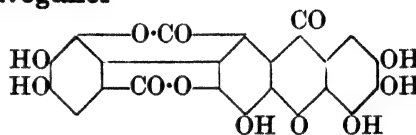
Badische, D.R.P., 10,785.

Knecht, Hibbert, *Ber.*, 1904, **37**, 3475.

Flavindin.

See Quindoline-carboxylic Acid.

Flavogallol



Probable constitution

$C_{21}H_8O_{12}$

MW, 452

Yellow needles. Chars without melting. Spar. sol. ord. org. solvents. NaOH \rightarrow orange sol. turning brown. $FeCl_3 \rightarrow$ green col.

Hexa-acetyl : m.p. 278-80°.

Hexa-benzoyl : m.p. 326-8°.

Bleuler, Perkin, *J. Chem. Soc.*, 1916, **109**, 533.

Flavogallone

$C_{20}H_{10}O_{11}$

MW, 426

M.p. above 340°. Spar. sol. ord. org. solvents. Alc. $FeCl_3 \rightarrow$ blue col.

Hepta-acetyl deriv. : m.p. 257-9°.

Bleuler, Perkin, *J. Chem. Soc.*, 1916, **109**, 537.

Flavogallonic Acid

$C_{21}H_{10}O_{13}$

MW, 470

Needles. M.p. above 300°. $Ac_2O + Py \rightarrow$ hexa-acetylflavogallol.

Me ester : $C_{22}H_{12}O_{13}$. MW, 484. Hepta-acetyl deriv. : m.p. 181-3°.

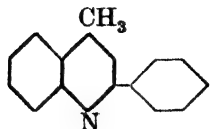
Et ester : $C_{23}H_{14}O_{13}$. MW, 498. M.p. above 300°. Hepta-acetyl deriv. : m.p. 215-17°.

Bleuler, Perkin, *J. Chem. Soc.*, 1916, **109**, 535.

Flavol.

See 2 : 6-Dihydroxyanthracene.

Flavoline (4-Methyl-2-phenylquinoline, 2-phenyl-lepidine)



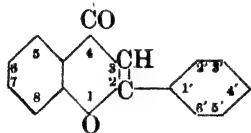
$C_{16}H_{13}N$

MW, 219

Plates from ligroin. M.p. 64–5°. B.p. 373–5°.
Methiodide : m.p. 185°.

Fischer, *Ber.*, 1886, 19, 1037.

Flavone (2-Phenyl- γ -benzpyrone, 2-phenyl-chromone)



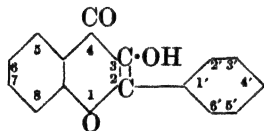
$C_{15}H_{10}O_2$

MW, 222

Needles from EtOH.Aq. M.p. 97°. Sol. ord.
org. solvents. Insol. H_2O .

Simonis, *Z. angew. Chem.*, 1926, 39, 1461
(Review, *Bibl.*).

Flavonol (3-Hydroxyflavone, flavandione-3 : 4)



$C_{15}H_{10}O_3$

MW, 238

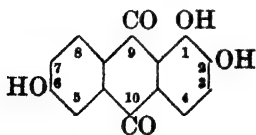
Yellow needles from EtOH. M.p. 169–70°.

Acetyl deriv. : m.p. 110–11°.

3-Oxime : m.p. 158–9° decomp.

Kostanecki, Szabranski, *Ber.*, 1904, 37,
2820.

Flavopurpurin (1 : 2 : 6-Trihydroxyanthra-quinone, 6-hydroxyalizarin)



$C_{14}H_8O_5$

MW, 256

Yellow needles. M.p. above 330°. B.p. 459°
decomp. Sublimes above 160°. Sol. EtOH,
 C_6H_6 . Mod. sol. boiling H_2O . Spar. sol. Et_2O .
Violet sol. in caustic alkalis, red to reddish-violet
in conc. H_2SO_4 .

2 : 6-Di-Me ether : $C_{16}H_{12}O_5$. MW, 284.

Dict. of Org. Comp.—II.

Yellow needles. M.p. 239°. Sol. $CHCl_3$. Spar.
sol. EtOH. Acetyl : m.p. 210°.

1 : 2 : 6-Tri-Me ether : $C_{17}H_{14}O_5$. MW, 298.
Yellow needles. M.p. 225–6°. Sol. C_6H_6 ,
AcOH. Spar. sol. EtOH.

2 : 6-Di-Et ether : $C_{18}H_{16}O_5$. MW, 312.
Reddish-yellow needles from EtOH. M.p. 209°.
Sol. hot AcOH.

Diacetyl deriv. : m.p. 238°.

Triacetyl : m.p. 202–3°.

Liebermann, Jellinek, *Ber.*, 1888, 21,
1171.

Graebe, Thode, *Ann.*, 1906, 349, 214.

Bistrzycki, Yssel, de Schipper, *Ber.*, 1898,
31, 2799.

Frobenius, Hepp, *Ber.*, 1907, 40, 1049.

Bayer, E.P., 26,601, (*Chem. Abstracts*,
1910, 4, 118).

Bayer, D.R.P., 217,552, (*Chem. Zentr.*,
1910, I, 700).

Flavoxanthin

$C_{40}H_{56}O_3$

MW, 584

Red prisms from MeOH. M.p. 184°. $[\alpha]_{D}^{20} +$
190° in C_6H_6 . Absorption bands at 478 m μ ,
447.5 m μ , 420 m μ in CS_2 ; 450 m μ , 422
m μ in pet. ether. 25% HCl in $Et_2O \rightarrow$ blue
col.

Kuhn, Brockmann, *Z. physiol. Chem.*,
1932, 213, 191.

Flemingine

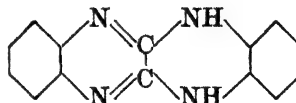
$C_{12}H_{12}O_3$

MW, 204

Dye from root of *Flemingia congesta*, Roxb.,
(Waras). Dark orange needles. M.p. 171–3°.
Sol. EtOH. Spar. sol. hot AcOH, C_6H_6 , $CHCl_3$.
Insol. CS_2 . Sol. alkalis. KOH fusion \rightarrow
salicylic and acetic acids.

Perkin, *J. Chem. Soc.*, 1898, 73, 661.

Fluoflavine (5 : 11-Dihydroquinoxaliquinox-
aline)



$C_{14}H_{10}N_4$

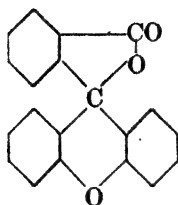
MW, 234

Yellow needles from AcOH. M.p. above
360°. Sol. hot AcOH with yellowish-green fluor.
Spar. sol. ord. org. solvents.

Hinsberg, Pollak, *Ber.*, 1896, 29, 784.

Hinsberg, *Ann.*, 1901, 319, 267.

Fluoran

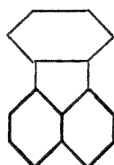
 $C_{20}H_{12}O_3$

MW, 300

Needles from EtOH. M.p. 182–3°.

Meyer, Hoffmeyer, *Ber.*, 1892, 25, 1385, 2118.

Fluoranthene (1:2-Benzacenaphthene, idryl)

 $C_{16}H_{10}$

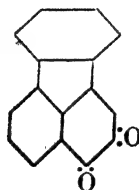
MW, 202

Needles or plates from EtOH. M.p. 110°. B.p. 250–1°/60 mm., 217°/30 mm. Sol. EtOH, Et₂O, CHCl₃, CS₂, C₆H₆, AcOH. Warm conc. H₂SO₄ → blue col.

Picrate: m.p. 184–5°.

Meyer, Taeger, *Ber.*, 1920, 53, 1264.
v. Braun, Anton, *Ber.*, 1929, 62, 145.

Fluoranthenequinone

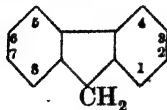
 $C_{16}H_8O_2$

MW, 232

Red needles from EtOH. M.p. 188°. Sol. EtOH, AcOH.

v. Braun, Anton, *Ber.*, 1929, 62, 151.

Fluorene (Diphenylenemethane, 2:3-benzindene)

 $C_{13}H_{10}$

MW, 166

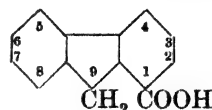
Fluorescent cryst. from EtOH. M.p. 116°. B.p. 293–5°. Sol. Et₂O, C₆H₆, CS₂, hot EtOH. CrO₃ in AcOH → fluorenone. Forms mono-

metallic derivs. with alkali metals. Forms many addn. comps.

Picrate: m.p. 77°.

Zelinsky, Titz, Gaverdowskaja, *Ber.*, 1926, 59, 2591.Jaeger, E.P., 364,629, (*Chem. Abstracts*, 1933, 27, 1643).Staudinger, Gaule, Siegwart, *Helv. Chim. Acta*, 1921, 4, 214.

Fluorene-1-carboxylic Acid

 $C_{14}H_{10}O_2$

MW, 210

Cryst. from EtOH.Aq. M.p. 245–6°. Sublimes. Sol. hot EtOH. Alk. KMnO₄ → fluorenone-1-carboxylic acid. Heat with lime → fluorene.Et ester: C₁₆H₁₄O₂. MW, 238. M.p. 53–5°.Fittig, Liepmann, *Ann.*, 1880, 200, 13.

Fluorene-2-carboxylic Acid.

Yellow cryst. Sublimes at 340°. Sol. hot AcOH.

Me ester: C₁₅H₁₂O₂. MW, 224. M.p. 120°.Nitrile: 2-cyanofluorene. C₁₄H₉N. MW, 191. M.p. 88°.Fortner, *Monatsh.*, 1904, 25, 448.

Fluorene-4-carboxylic Acid.

Cryst. from Et₂O. M.p. 175°.

Me ester: m.p. 64°.

Graebe, Aubin, *Ann.*, 1888, 247, 283.

Fluorene-9-carboxylic Acid (Diphenyleneacetic acid).

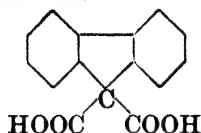
Needles from AcOH. M.p. 230–2°.

Me ester: C₁₅H₁₂O₂. MW, 224. M.p. 63°.Et ester: C₁₆H₁₄O₂. MW, 238. M.p. 44–5°.

B.p. 207–9°/19 mm.

Chloride: C₁₄H₉OCl. MW, 228.5. M.p. 77°.Amide: C₁₄H₁₁ON. MW, 209. M.p. 251°.Anhydride: C₂₈H₁₈O₃. MW, 402. M.p. 164–5°.Nitrile: 9-cyanofluorene. C₁₄H₉N. MW, 191. M.p. 151–2°.Vorländer, Pritzsche, *Ber.*, 1913, 46, 1794.
Schlenk, Hillemann, Rodloff, *Ann.*, 1931, 487, 152.Kliegl, *Ber.*, 1931, 64, 2420.Wislicenus, Ruthing, *Ber.*, 1913, 46, 2771.

Fluorene-9 : 9-dicarboxylic Acid (*Diphenylenemalonic acid*)



$C_{15}H_{10}O_4$ MW, 254

Di-Me ester : $C_{17}H_{14}O_4$. MW, 282. M.p. 167°.

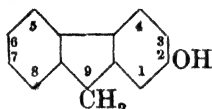
Di-Et ester : $C_{19}H_{18}O_4$. MW, 310. Cryst. from EtOH. M.p. 99-5°. B.p. 220-2°/13 mm.

Adickes, Brunnert, Lückner, Schäfer, J. prakt. Chem., 1932, 133, 320.

Fluorene Ketone.

See Fluorenone.

2-Fluorenyl (*2-Hydroxyfluorene, 2-fluorenyl alcohol*)



$C_{13}H_{10}O$ MW, 182

Leaflets from H_2O . Needles from $CHCl_3$. M.p. 171°. Sol. EtOH, Et_2O , AcOH. Insol. cold H_2O . Sol. alkalis, hot NH_3 -Aq.

Me ether : $C_{14}H_{12}O$. MW, 196. M.p. 106-8°.

Diels, Ber., 1901, 34, 1761.

Riuz, Chem. Abstracts, 1929, 23, 4691.

9-Fluorenyl (*9-Hydroxyfluorene, 9-fluorenyl alcohol, diphenylenecarbinol*).

Cryst. from pet. ether. M.p. 153° (156°). Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. EtOH-Aq.

Me ether : m.p. 43-5°.

Fluorenyl ether : difluorenyl ether. $C_{26}H_{18}O$. MW, 346. Cryst. from Ac_2O . M.p. 228° (270°).

Acetyl : (i) m.p. 75°. (ii) M.p. 208-9°.

Benzoyl : (i) m.p. 100°. (ii) M.p. 161°.

Staudinger, Gaule, Ber., 1916, 49, 1956.

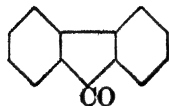
Kliegl, Ber., 1929, 62, 1327.

Bachmann, J. Am. Chem. Soc., 1933, 55, 773.

Fluorenyl-carboxylic Acid.

See Hydroxyfluorene-carboxylic Acid.

Fluorenone (*Fluorene ketone, diphenylene ketone*)



$C_{13}H_8O$ MW, 180

M.p. 83-0-83-5° (84-6°). B.p. 341-5°. Insol. H_2O . Forms many add. comps.

Oxime : 9-isonitrosofluorene. M.p. 195°. *Me ether* : m.p. 145-6°. *Acetyl deriv.* : m.p. 79° (76°).

Hydrazone : m.p. 149-50°. *N-Benzylidene* : m.p. 91-4° (82-4°).

Phenylhydrazone : m.p. 151-2°.

p-Nitrophenylhydrazone : m.p. 269°.

Phenylsemicarbazone : m.p. 222°.

Di-Me acetal : m.p. 87-8°.

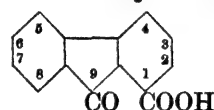
Huntress, Hershberg, Cliff, J. Am. Chem. Soc., 1931, 53, 2720.

Jaeger, U.S.P., 1,868,531, (Chem. Abstracts, 1932, 26, 5315).

Courtot, Pierron, Bull. soc. chim., 1929, 65, 290.

See also Kuhn, Wassermann, Ber., 1925, 58, 2230.

Fluorenone-1-carboxylic Acid



$C_{14}H_8O_3$ MW, 224

Orange-red needles from dil. EtOH. M.p. 191-2°. Sol. EtOH, Et_2O . Prac. insol. cold H_2O . Heat \rightarrow fluorenone. $NaHg \rightarrow$ fluorene-1-carboxylic acid. $Zn \rightarrow$ fluorene. KOH fusion \rightarrow diphenyl-2 : 3'-dicarboxylic acid.

Me ester : $C_{15}H_{10}O_3$. MW, 238. Yellow needles. M.p. 86-9°.

Et ester : $C_{16}H_{12}O_3$. MW, 252. Yellow needles from dil. EtOH. M.p. 84-6°.

Chloride : $C_{14}H_7O_2Cl$. MW, 242-5. Yellow needles from C_6H_6 . M.p. 140°.

Amide : $C_{14}H_8O_2N$. MW, 223. Yellow needles from EtOH. M.p. 229-30°.

Oxime : yellow prisms from EtOH. M.p. 230° decomp.

Fittig, Liepmann, Ann., 1880, 200, 6.

Fluorenone-2-carboxylic Acid.

Yellow needles from EtOH or AcOH. Sublimes at about 340°. Spar. sol. EtOH.

Me ester : yellow needles from MeOH. M.p. 181°.

Bamberger, Hooker, Ann., 1885, 229, 158.

Fortner, Monatsh., 1904, 25, 451.

Dziewoński, Schnayder, Chem. Abstracts, 1931, 25, 5416.

Fluorenone-4-carboxylic Acid.

Yellow needles from EtOH. M.p. 227°. Insol. H_2O . $HI + P$ at 180-200° \rightarrow fluorene.

$\text{Zn} + \text{NH}_3 \longrightarrow$ 9-hydroxyfluorene-4-carboxylic acid. KOH fusion \longrightarrow diphenic acid.

Me ester : yellow needles. M.p. 132°.

Et ester : yellow needles from EtOH. M.p. 103°.

Chloride : yellow needles from C_6H_6 . M.p. 128°.

Amide : yellow needles + $\frac{1}{2}$ EtOH from EtOH. M.p. 230° (225°).

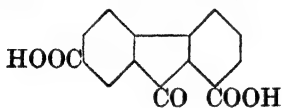
Nitrile : $\text{C}_{14}\text{H}_9\text{ON}$. MW, 205. Yellow needles. M.p. 240°.

Oxime : m.p. 263°.

Graebe, Aubin, *Ber.*, 1887, 20, 845.

Stobbe, Seydel, *Ann.*, 1909, 370, 134.

Fluorenone-1 : 7-dicarboxylic Acid



$\text{C}_{15}\text{H}_8\text{O}_5$

MW, 268

Yellow needles from AcOH. Sol. PhNO_2 . Spar. sol. AcOH. Prac. insol. H_2O , EtOH, Et_2O , CHCl_3 , C_6H_6 . $\text{NaHg} \longrightarrow$ fluorene-1 : 7-dicarboxylic acid. Ox. \longrightarrow hemimellitic and trimellitic acids. KOH fusion \longrightarrow diphenyl-2 : 4 : 3'-tricarboxylic acid.

Di-Me ester : $\text{C}_{17}\text{H}_{12}\text{O}_5$. MW, 296. Cryst. from C_6H_6 . M.p. 188-9° (184°).

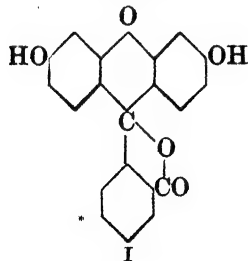
Di-Et ester : $\text{C}_{19}\text{H}_{16}\text{O}_5$. MW, 324. Yellow needles. M.p. 114-5°.

Bamberger, Hooker, *Ann.*, 1885, 229, 151.

Fluorenyl Alcohol.

See Fluorenol.

Fluorescein



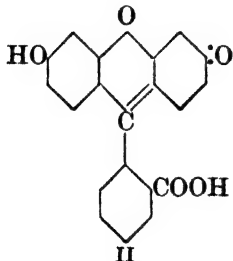
$\text{C}_{20}\text{H}_{12}\text{O}_5$

MW, 332

Compound showing intense fluor. in alk. sol. Antiseptic and mild purgative. Employed in cancer treatment.

I.

Yellow amorph. form. M.p. 314-16° (sealed tube). Becomes cryst. on heating. Sol. Me_2CO , MeOH, formic acid. Spar. sol. H_2O , EtOH,



II.

Et_2O , CHCl_3 , C_6H_6 , AcOH, xylene, PhNO_2 . Insol. pet. ether.

Me ether : $\text{C}_{21}\text{H}_{14}\text{O}_5$. MW, 346. M.p. 272°.

Et ether : $\text{C}_{22}\text{H}_{16}\text{O}_5$. MW, 360. M.p. 253-4°.

II.

Red cryst. form with green iridescence. M.p. 314-16° decomp. (sealed tube). Sol. hot formic acid, hot aniline, hot Me_2CO . Spar. sol. H_2O , EtOH, Et_2O , MeOH, AcOH. Insol. pet. ether.

Me ester : $\text{C}_{21}\text{H}_{14}\text{O}_5$. MW, 346. Red cryst. with green iridescence from MeOH. M.p. 282°. Spar. sol. ord. org. solvents. *Me ether* : $\text{C}_{22}\text{H}_{16}\text{O}_5$. MW, 360. Orange-yellow needles or deep red cryst. with metallic lustre from C_6H_6 -MeOH. M.p. 208°.

Et ester : $\text{C}_{22}\text{H}_{16}\text{O}_5$. MW, 360. Green leaflets from EtOH. M.p. 247° (242°). Spar. sol. EtOH, Me_2CO , AcOH. Insol. H_2O . *Et ether* : $\text{C}_{24}\text{H}_{20}\text{O}_5$. MW, 388. Yellow needles from EtOH.Aq. M.p. 159°. *Acetyl deriv.* : m.p. 191°.

Liebig, *J. prakt. Chem.*, 1912, 86, 472.

Fischer, Hepp, *Ber.*, 1913, 46, 1952.

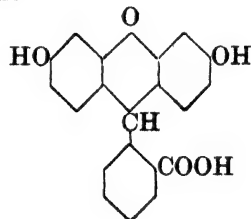
Kehrmann, *ibid.*, 3028.

George, *Chem. Abstracts*, 1927, 21, 239.

Orndorff, Hemmer, *J. Am. Chem. Soc.*, 1927, 49, 1272 (*Review, Bibl.*).

See also Dominikiewicz, *Chem. Abstracts*, 1931, 25, 941.

Fluorescin



$\text{C}_{20}\text{H}_{14}\text{O}_5$

MW, 334

Needles from AcOH. M.p. 125-7°. Sol. Et_2O . Turns yellow in air. Sol. alkalis \longrightarrow colourless sols. Ox. \longrightarrow fluorescein.

Derivs. of this comp. are often wrongly described as derivs. of fluorescein. The literature of fluorescein and fluorescein is somewhat confused.

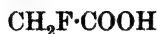
Di-Me ether : $\text{C}_{22}\text{H}_{18}\text{O}_5$. MW, 362. Needles from EtOH. M.p. 204-5°. *Me ester* : $\text{C}_{23}\text{H}_{20}\text{O}_5$. MW, 376. Cryst. from EtOH. M.p. 136°.

Di-Et ether : $\text{C}_{24}\text{H}_{22}\text{O}_5$. MW, 390. M.p. 187°. CrO_3 in AcOH \longrightarrow fluorescein di-Et ether. *Et ester* : $\text{C}_{26}\text{H}_{26}\text{O}_5$. MW, 418. Needles from EtOH. M.p. 111°.

Et ester : $\text{C}_{22}\text{H}_{18}\text{O}_5$. MW, 362. Needles from AcOH. M.p. 195-6°. Turns yellow in air.

Diacetyl: m.p. 200–2°.

Liebig, *J. prakt. Chem.*, 1913, **88**, 42.

Fluoroacetic Acid

MW, 78

M.p. 33°. B.p. 165°. Heat of comb. C_v 171.08 Cal. Burns with green flame.

Me ester: $\text{C}_3\text{H}_5\text{O}_2\text{F}$. MW, 92. B.p. 104.5°. D^{15}_4 1.16128. Sol. H_2O .

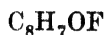
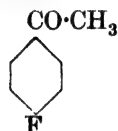
Et ester: $\text{C}_4\text{H}_7\text{O}_2\text{F}$. MW, 106. B.p. about 120°. Heat of comb. C_v 502.55 Cal.

Amide: fluoroacetamide. $\text{C}_2\text{H}_4\text{ONF}$. MW, 77. Cryst. from CHCl_3 . M.p. 108°.

Swarts, *Bull. soc. chim.*, 1896, **15**, 1134.

Fluoroacetanilide.

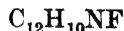
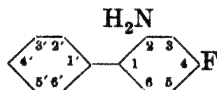
See under Fluoroaniline.

***p*-Fluoroacetophenone**

MW, 138

M.p. – 4.5°. B.p. 77–8°/10 mm.

Schiemann, Pillarsky, *Ber.*, 1931, **64**, 1345.

4-Fluoro-2-aminodiphenyl

MW, 187

N-Acetyl: m.p. 98°.

van Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.

2'-Fluoro-2-aminodiphenyl.

M.p. 91°.

N-Acetyl: m.p. 102°.

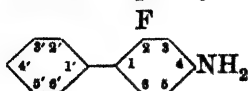
See previous reference.

4'-Fluoro-2-aminodiphenyl.

M.p. 42–42.5°. B.p. 186–7°/40 mm. Ox. → *p*-fluorobenzoic acid.

N-Acetyl: m.p. 120°.

See previous reference.

2-Fluoro-4-aminodiphenyl

MW, 187

Ox. → benzoic acid.

N-Acetyl: prisms. M.p. 155°.

van Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.

2'-Fluoro-4-aminodiphenyl.

M.p. 36°. B.p. 199–201°/25 mm.

N-Acetyl: m.p. 147–8°.

See previous reference.

4'-Fluoro-4-aminodiphenyl.

Leaflets from EtOH. M.p. 120° (121°).

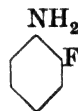
N-Acetyl: m.p. 205–205.5°.

Marler, Turner, *J. Chem. Soc.*, 1931, 1362.

See also previous reference.

3-Fluoro-β-aminoethyl-benzene.

See 2-*m*-Fluorophenylethylamine.

***o*-Fluoroaniline**

MW, 111

M.p. – 34.6° (– 28.95°). B.p. 174.5–176°/757 mm., 94.6°/55 mm., 68.5°/14 mm., 58°/11 mm.

N-Acetyl: *o*-fluoroacetanilide. $\text{C}_8\text{H}_8\text{ONF}$. MW, 153. M.p. 80°. B.p. 140–2°/14 mm.

N-Dimethyl: *o*-fluorodimethylaniline. $\text{C}_8\text{H}_{10}\text{NF}$. MW, 139. B.p. 64–5°/13 mm. *Picrate*: m.p. 131°.

Schiemann, Pillarsky, *Ber.*, 1929, **62**, 3041.

Braun, Rudolf, *Ber.*, 1931, **64**, 2469.

***m*-Fluoroaniline.**

Yellow liq. B.p. 186.1°/754 mm. (187–9°). 82.3°/18 mm. D^{15}_4 1.16004.

N-Acetyl: *m*-fluoroacetanilide. M.p. 88° (84.6°, 83°).

Ingold, Vass, *J. Chem. Soc.*, 1928, 421.

Braun, Rudolf, *Ber.*, 1931, **64**, 2470.

Schiemann, *Z. physik. Chem.*, 1931, **156A**, 418.

***p*-Fluoroaniline.**

M.p. – 0.82° (– 1.9°). B.p. 184–6°, 85°/19 mm. D^{20}_4 1.1725. n^{20}_D 1.51954.

B.HCl: b.p. 167°/27 mm.

N-Acetyl: *p*-fluoroacetanilide. M.p. 152°.

N-Benzoyl: *p*-fluorobenzanilide. M.p. 185°.

N-p-Nitrobenzoyl: m.p. 180.5°.

N-Dimethyl: *p*-fluorodimethylaniline. M.p. 25°. B.p. 78–79.5°/16 mm. *B, HCl*: m.p. 118°. *Picrate*: m.p. 151.5°.

N-Diethyl: *p*-fluorodiethylaniline. $C_{10}H_{14}NF$. MW, 167. B.p. 92.5°/12 mm.

Bergmann, Hoffmann, Meyer, *J. prakt. Chem.*, 1933, 135, 258.

Schiemann, Winkel Müller, *Ber.*, 1933, 66, 731.

Schiemann, Pillarsky, *Ber.*, 1929, 62, 3041.

2-Fluoro-*p*-anisidine (2-Fluoro-4-aminoanisole)



C_7H_8ONF

MW, 141

M.p. 82.6°.

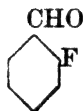
B, HCl: m.p. 180–200° decomp.

Schiemann, Miao, *Ber.*, 1933, 66, 1186.

Fluoroanisole.

See under Fluorophenol.

***o*-Fluorobenzaldehyde**



C_7H_5OF

MW, 124

M.p. – 44.5°. B.p. 175°, 80.5°/36 mm.

Oxime: m.p. 63°.

Phenylhydrazone: m.p. 89.5°.

p-Nitrophenylhydrazone: m.p. 205°.

Schiemann, *Z. physik. Chem.*, 1931, 156A, 417.

Shoesmith, Sosson, Slater, *J. Chem. Soc.*, 1926, 2761.

***m*-Fluorobenzaldehyde.**

Oil. B.p. 173°, 76°/26 mm.

Oxime: m.p. 63°.

Phenylhydrazone: m.p. 114°.

p-Nitrophenylhydrazone: m.p. 202°.

See previous references.

***p*-Fluorobenzaldehyde.**

M.p. – 10°. B.p. 174.5°/752 mm. (181.5°), 104.5°/74 mm.

Oxime: (a) *syn*-, m.p. 116–17°. (b) *Anti*-, m.p. 86.5°.

Phenylhydrazone: m.p. 147°.

p-Nitrophenylhydrazone: m.p. 212°.

See previous references.

Fluorobenzanilide.

See under Fluoroaniline.

Fluorobenzene



C_6H_5F

MW, 96

F.p. – 39.2° (– 40.5°). M.p. – 41.2°. B.p. 85.2°. D_4^{20} 1.0236. n_D^{20} 1.46773. Heat of comb. C_r 746.26, C_p 746.84 Cal.

$C_6H_5F, SbCl_3$: m.p. 10° decomp.

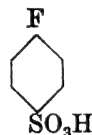
Balz, Schieman, *Ber.*, 1927, 60, 1188.

Tronov, Krüger, *Chem. Abstracts*, 1927, 21, 3887.

Flood, *Organic Syntheses*, 1933, XIII, 46 (*Bibl.*).

Allen, Sugden, *J. Chem. Soc.*, 1932, 762.

***p*-Fluorobenzenesulphonic Acid**



$C_6H_5O_3FS$

MW, 176

Salts sol. H_2O , EtOH. *K* salt heated with $HCl \rightarrow$ fluorobenzene.

Chloride: $C_6H_4O_2FCIS$. MW, 194.5. M.p. 30°. Sol. Et_2O , C_6H_6 , $CHCl_3$.

Amide: $C_6H_4O_2NFS$. MW, 175. Plates or needles from H_2O . M.p. 123°. Sol. EtOH, Et_2O , Me_2CO . Spar. sol. H_2O , C_6H_6 .

Holleman, *Rec. trav. chim.*, 1905, 24, 30.

Lenz, *Ber.*, 1879, 12, 580.

***o*-Fluorobenzoic Acid**



$C_7H_5O_2F$

MW, 140

Cryst. from H_2O . M.p. 126.5°. Sol. EtOH, Et_2O . $k = 3 \times 10^{-4}$ at 25°. Heat of comb. C_r 739.92 Cal.

Me ester: $C_8H_7O_2F$. MW, 154. M.p. – 20°. B.p. 209°, 89–90°/14 mm.

Et ester: $C_9H_9O_2F$. MW, 168. B.p. 221°.

Chloride: C_7H_4OClF . MW, 158.5. M.p. 4°. B.p. 206°, 85°/14 mm.

Amide: C_7H_5ONF . MW, 139. M.p. 116° (114°).

Dippy, Williams, *J. Chem. Soc.*, 1934, 1466.

Holleman, Slothouwer, *Chem. Abstracts*, 1911, 5, 1905.

Meyer, Hub, *Monatsh.*, 1910, 31, 933.

Bergmann, Bondi, *Ber.*, 1931, 64, 1474.

Rinkes, *Chem. Zentr.*, 1919, I, 821.

Slothouwer, *Rec. trav. chim.*, 1914, 33, 324.

m-Fluorobenzoic Acid.

Leaflets from hot H_2O . M.p. 123.6° (124°). $k = 1.4 \times 10^{-4}$ at 25° . Heat of comb. C_v 737.36 Cal.

Me ester: m.p. -10° . B.p. 197° .

Et ester: b.p. 209° .

Chloride: m.p. -30° . B.p. 189° (204°), $91^\circ/18$ mm.

Amide: m.p. 130° .

See first three references above.

p-Fluorobenzoic Acid.

Prisms from H_2O . M.p. 182.6° . Sol. EtOH, Et_2O , hot H_2O . $k = 1.4 \times 10^{-4}$ at 25° . Heat of comb. C_v 739.43 Cal.

Me ester: m.p. 4.5° . B.p. 198° .

Et ester: m.p. 26° . B.p. 210° .

Chloride: m.p. 9° . B.p. 193° .

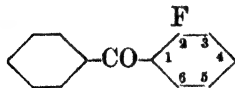
Amide: m.p. 154.5° . B.p. $104^\circ/38$ mm.

Nitrile: p-fluorobenzonitrile. C_7H_4NF . MW, 121. M.p. 34.8° . B.p. $188.2^\circ/750$ mm.

Dippy, Williams, *J. Chem. Soc.*, 1934, 1466.

Schiemann, Winkelmüller, *Organic Syntheses*, 1933, XIII, 52 (Bibl.).

2-Fluorobenzophenone (Phenyl 2-fluorophenyl ketone)



$C_{13}H_9OF$

MW, 200

Oil. B.p. $150^\circ/16$ mm.

Oxime: m.p. 126° .

Bergmann, Bondi, *Ber.*, 1931, 64, 1474.

4-Fluorobenzophenone (Phenyl 4-fluorophenyl ketone).

Cryst. from pet. ether. M.p. $48.2-48.7^\circ$. B.p. $159-61^\circ/13$ mm.

Oxime: m.p. 135° .

Phenylhydrazone: m.p. 105° .

Bergmann, Hoffmann, Meyer, *J. prakt. Chem.*, 1933, 135, 257.

Koopal, *Rec. trav. chim.*, 1915, 34, 157.

Dunlop, Gardner, *J. Am. Chem. Soc.*, 1933, 55, 1665.

o-Fluorobromobenzene



C_6H_4FBr

MW, 175

B.p. $57^\circ/22$ mm.

Bergmann, Engel, St. Sándor, *Z. physik. Chem.*, 1930, 10B, 120.

m-Fluorobromobenzene.

B.p. $149-51^\circ/764$ mm.

Schiemann, Pillarsky, *Z. physik. Chem.*, 1931, 156A, 413.

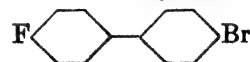
p-Fluorobromobenzene.

F.p. -17.4° . M.p. -8 to -7.5° . B.p. $151.6-151.9^\circ/755$ mm. ($153.5^\circ/756$ mm). D_4^{20} 1.597. n_D^{20} 1.52855.

Allen, Sugden, *J. Chem. Soc.*, 1932, 762.

Schiemann, Pillarsky, *Ber.*, 1931, 64, 1343.

4'-Fluoro-4-bromobiphenyl



$C_{12}H_8FBr$

MW, 251

Needles from EtOH. M.p. $97-9^\circ$. Ox. \rightarrow p-bromobenzoic acid.

Marler, Turner, *J. Chem. Soc.*, 1931, 1362.

Schiemann, Pillarsky, *Ber.*, 1931, 64, 1344.

sym.-Fluorobromoethane (Ethylene fluorobromide)



C_2H_4FBr

MW, 127

B.p. $71-72.5^\circ$.

Swarts, *Rec. trav. chim.*, 1914, 33, 262.

sym.-Fluorobromoethylene (1-Fluoro-2-bromoethylene, acetylene fluorobromide)



C_2H_2FBr

MW, 125

B.p. 36° . D_4^{25} 1.6939.

Swarts, *Chem. Zentr.*, 1909, II, 1414; *Bull. soc. chim.*, 1919, 25, 153.

unsym.-Fluorobromoethylene (1-Fluoro-1-bromoethylene) $\text{C}_2\text{H}_2\text{FBr}$

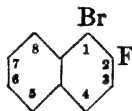
MW, 125

B.p. 12.5° (30–35°, 6.8°).

Swarts, *Chem. Zentr.*, 1909, II, 1414;
1911, II, 848.**Fluorobromomethane** (Methylene fluorobromide) CH_2FBr

MW, 113

B.p. 18–20°.

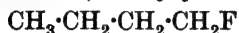
Swarts, *Chem. Zentr.*, 1910, I, 1868.**2-Fluoro-1-bromonaphthalene** $\text{C}_{10}\text{H}_6\text{FBr}$

MW, 225

Cryst. from MeOH. M.p. 49°.

Nataka, *Ber.*, 1931, 64, 2067.**4-Fluoro-1-bromonaphthalene.**

Needles from MeOH. M.p. 37°. Sol. ord. org. solvents.

Schiemann, Gueffroy, Winkel Müller, *Ann.*,
1931, 487, 285.**1-Fluorobutane** (n-Butyl fluoride) $\text{C}_4\text{H}_9\text{F}$

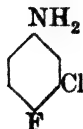
MW, 76

B.p. 31.95–31.98°/745.8 mm. D_4^{20} 0.7761.
 n_D^{20} 1.3419.Desreux, *Chem. Zentr.*, 1934, II, 2516.**2-Fluorobutane** (sec.-n-Butyl fluoride) $\text{C}_4\text{H}_9\text{F}$

MW, 76

B.p. 25.25–25.27°/765 mm. D_4^{18} 0.700. n_D^{12}
1.3366.

See previous reference.

4-Fluoro-3-chloroaniline $\text{C}_6\text{H}_5\text{NFCI}$

MW, 145.5

Plates. M.p. 43.9° (44°).

Rinkes, *Chem. Abstracts*, 1916, 10, 194.Ingold, Vass, *J. Chem. Soc.*, 1928, 423.**3-Fluoro-4-chloroaniline** $\text{C}_6\text{H}_5\text{NFCI}$

MW, 145.5

M.p. 61–2°. B.p. about 220°.

N-Acetyl: 3-fluoro-4-chloroacetanilide.
 $\text{C}_8\text{H}_7\text{ONFCI}$ MW, 187.5. M.p. 115°.Ingold, Vass, *J. Chem. Soc.*, 1928, 422.**6-Fluoro-2-chlorobenzaldehyde** $\text{C}_7\text{H}_4\text{OFCl}$

MW, 158.5

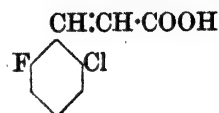
B.p. 104–5°/20 mm.

Semicarbazone: m.p. 213°.

Willstaedt, *Ber.*, 1931, 64, 2691.**o-Fluorochlorobenzene** $\text{C}_6\text{H}_4\text{FCl}$

MW, 130.5

M.p. –42.5°. B.p. 138–40°/758 mm.

Ingold, Vass, *J. Chem. Soc.*, 1928, 423.Rinkes, *Chem. Abstracts*, 1916, 10, 194.**p-Fluorochlorobenzene.**F.p. –27.7°. M.p. –26.85°. B.p. 130°/
756 mm. (130–15°/757 mm.). D_4^{20} 1.226. $n_D^{11.2}$
1.4989.Ingold, Vass, *J. Chem. Soc.*, 1928, 2265.Allen, Sugden, *J. Chem. Soc.*, 1932, 762.**6-Fluoro-2-chlorocinnamic Acid** $\text{C}_9\text{H}_6\text{O}_2\text{FCl}$

MW, 200.5

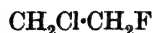
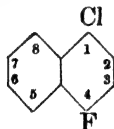
M.p. 212°.

Willstaedt, *Ber.*, 1931, 64, 2692.**4'-Fluoro-4-chlorodiphenyl** $\text{C}_{12}\text{H}_8\text{FCl}$

MW, 206.5

Needles from EtOH. M.p. 87–8°.

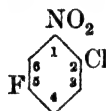
Marler, Turner, *J. Chem. Soc.*, 1931, 1362.

sym.-Fluorochloroethane (*Ethylene fluoro-chloride*) $\text{C}_2\text{H}_4\text{FCl}$ MW, 82.5B.p. 10–11°. Sol. EtOH. Insol. H_2O .Swarts, *Chem. Zentr.*, 1903, I, 13.**sym.-Fluorochloroethylene** (*1-Fluoro-2-chloroethylene, acetylene fluoro-chloride*) $\text{C}_2\text{H}_2\text{FCl}$ MW, 80.5B.p. 10–11°. Sol. EtOH. Insol. H_2O .Swarts, *Chem. Zentr.*, 1903, I, 13.**4-Fluoro-1-chloronaphthalene** $\text{C}_{10}\text{H}_6\text{FCl}$ MW, 180.5

Cryst. from EtOH. M.p. 85°.

Mauzelius, *Öfversigt Kongelige Svenska Vetenskaps Akademiens, Förhandlingar*, 1890, 445.**5-Fluoro-1-chloronaphthalene.**

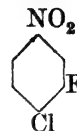
Prisms. M.p. 32°. Sol. EtOH.

Mauzelius, *Öfversigt Kongelige Svenska Vetenskaps Akademiens, Förhandlingar*, 1889, 581.**5-Fluoro-2-chloronitrobenzene** $\text{C}_6\text{H}_3\text{O}_2\text{NFCI}$ MW, 175.5

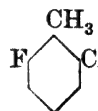
Prisms. M.p. 37.25°. B.p. 238.5°.

Swarts, *Rec. trav. chim.*, 1915, 35, 144.**4-Fluoro-3-chloronitrobenzene** $\text{C}_6\text{H}_3\text{O}_2\text{NFCI}$ MW, 175.5

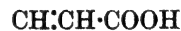
M.p. 41.5°. B.p. 227–32°. Volatile in steam.

Rinkes, *Chem. Weekblad*, 1914, 11, 952.Ingold, Vass, *J. Chem. Soc.*, 1928, 422.**6-Fluoro-3-chloronitrobenzene.**Prisms from ligroin. M.p. 10.2°. B.p. 138.5°/29 mm. $\text{KOH} \rightarrow$ 4-chloro-2-nitrophenol.Swarts, *Rec. trav. chim.*, 1915, 35, 135.**3-Fluoro-4-chloronitrobenzene** $\text{C}_6\text{H}_3\text{O}_2\text{NFCI}$ MW, 175.5

Pale yellow leaflets from ligroin. M.p. 63–4°. B.p. 114–16°/24 mm.

Ingold, Vass, *J. Chem. Soc.*, 1928, 422.**6-Fluoro-o-chlorotoluene** $\text{C}_7\text{H}_6\text{FCl}$ MW, 144.5

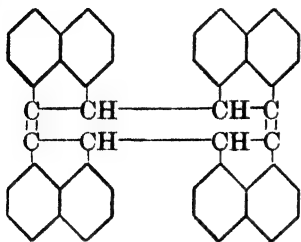
B.p. 153–4°.

Willstaedt, *Ber.*, 1931, 64, 2691. **α -Fluorocinnamic Acid** $\text{C}_9\text{H}_7\text{O}_2\text{F}$ MW, 166Prisms. M.p. 157.6°. B.p. 290°. Sol. EtOH, Et_2O . Heat of comb. C_v 1011.3 Cal. $k = 2.0 \times 10^{-3}$ at 25°. Br in $\text{CHCl}_3 \rightarrow \alpha$ -fluoro- $\alpha\beta$ -dibromohydrocinnamic acid.Swarts, *Bull. soc. chim.*, 1919, 25, 326, 329.**2-Fluorocinnamic Acid** (*o-Fluorocinnamic acid*) $\text{C}_9\text{H}_7\text{O}_2\text{F}$ MW, 166Needles from H_2O . M.p. 175°. Br \rightarrow *o*-fluoro- $\alpha\beta$ -dibromohydrocinnamic acid, m.p. 183°.*Et ester*: $\text{C}_{11}\text{H}_{11}\text{O}_2\text{F}$. MW, 194. B.p. 140–1°/11 mm.Willstaedt, *Ber.*, 1931, 64, 2689.**3-Fluorocinnamic Acid** (*m-Fluorocinnamic acid*).

M.p. 166.5°.

Schiemann, *Ber.*, 1932, 65, 1438.

Fluorocyclene (*Tetraperinaphthylencyclo-octadiene*)



$C_{48}H_{28}$

MW, 604

Yellow needles from C_6H_6 . M.p. $396-7^\circ$. Sol. hot $PhNO_2$, hot cymene. Spar. sol. hot $CHCl_3$, hot C_6H_6 , hot CS_2 . Insol. EtOH, Et₂O. Sols. show violet fluor. $Na_2Cr_2O_7$ in AcOH \rightarrow naphthalic anhydride.

Suknarowski, *Ber.*, 1918, 51, 463.

Dziewoński, Suszko, *Ber.*, 1925, 58, 723.

Fluorodiethylaniline.

See under Fluoroaniline.

Fluorodimethylaniline.

See under Fluoroaniline.

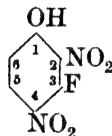
Fluorodinitroanisole.

See under Fluorodinitrophenol.

Fluorodinitrophenetole.

See under Fluorodinitrophenol.

3-Fluoro-2 : 4-dinitrophenol



$C_6H_3O_5N_2F$

MW, 202

Pale yellow cryst. from ligroin. M.p. $138-9^\circ$. Volatile in steam.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1881.

5-Fluoro-2 : 4-dinitrophenol.

Needles from H_2O or ligroin. M.p. 80° . Volatile in steam.

See previous reference.

6-Fluoro-2 : 4-dinitrophenol.

M.p. 102° .

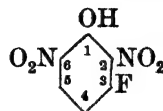
Me ether : 6-fluoro-2 : 4-dinitroanisole.

$C_7H_5O_5N_2F$. MW, 216. B.p. $164-5^\circ/10$ mm.

Et ether : 6-fluoro-2 : 4-dinitrophenetole. $C_8H_7O_5N_2F$. MW, 230. B.p. $168^\circ/13$ mm.

Schiemann, Miao, *Ber.*, 1933, 66, 1185.

3-Fluoro-2 : 6-dinitrophenol



$C_6H_3O_5N_2F$

MW, 202

Needles from ligroin. M.p. 68.5° .

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1881.

4-Fluoro-2 : 6-dinitrophenol.

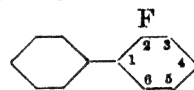
M.p. $50-50.2^\circ$.

Me ether : 4-fluoro-2 : 6-dinitroanisole.

$C_7H_5O_5N_2F$. MW, 216. M.p. $81.7-82.7^\circ$.

Schiemann, Miao, *Ber.*, 1933, 66, 1186.

2-Fluorodiphenyl



$C_{12}H_9F$

MW, 172

Prisms. M.p. 73.5° . B.p. 248° . Volatile in steam. $D_4^{25} 1.2452$.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

Schiemann, Roselius, *Ber.*, 1929, 62, 1809.

Mascarelli, Gatti, Pirona, *Atti accad.*

Linnei, 1931, 14, 510.

3-Fluorodiphenyl.

M.p. $26-7^\circ$. $D_4^{18} 1.2874$.

Schiemann, Roselius, *Ber.*, 1929, 62, 1810.

4-Fluorodiphenyl.

Plates. M.p. 74.2° . B.p. 253° . Volatile in steam. $D_4^{25} 1.247$.

See previous reference and also

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

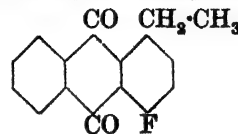
Fluoroethane.

See Ethyl fluoride.

Fluoroethyl Alcohol.

See Ethylene fluorohydrin.

4-Fluoro-1-ethylantraquinone



$C_{18}H_{11}O_2F$

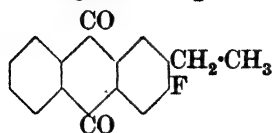
MW, 254

Cryst. from C_6H_6 . M.p. $80-2^\circ$.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, 47, 2359.

3-Fluoro-2-ethylantraquinone

3-Fluoro-2-ethylantraquinone



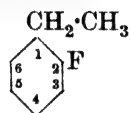
$C_{16}H_{11}O_2F$

MW, 254

Cryst. from C_6H_6 . M.p. 110° .

See previous reference.

o-Fluoro-ethylbenzene



C_8H_9F

MW, 124

B.p. $136-7^\circ$. D_4^{20} 1.002, D_6^{20} 0.983.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, **47**, 2359.

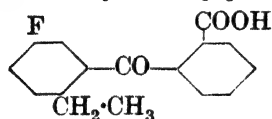
p-Fluoro-ethylbenzene.

B.p. $142-3^\circ/755$ mm. (141°). D_4^{20} 0.994, D_6^{20} 0.967.

Schiemann, Pillarsky, *Ber.*, 1931, **64**, 1344.

See also previous reference.

o-[5-Fluoro-2-ethylbenzoyl]-benzoic Acid



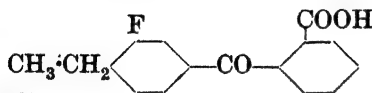
$C_{16}H_{13}O_3F$

MW, 272

Cryst. from C_6H_6 or AcOH. M.p. $210-20^\circ$. $H_2SO_4 \rightarrow$ 4-fluoro-1-ethylantraquinone.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, **47**, 2359.

o-[3-Fluoro-4-ethylbenzoyl]-benzoic Acid



$C_{16}H_{13}O_3F$

MW, 272

Cryst. from C_6H_6 or AcOH. M.p. 120° . $H_2SO_4 \rightarrow$ 3-fluoro-2-ethylantraquinone.

See previous reference.

Fluoroethylene.

See Vinyl fluoride.

Fluoroform (Trifluoromethane)



CHF_3

MW, 70

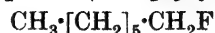
3-Fluorohydrocinnamic Acid

B.p. 20° at 40 atm. press. Sol. H_2O . Alc. $KOH \rightarrow KF + H\cdot COOK$.

Valentiner, Schwarz, D.R.P., 105,916, (*Chem. Zentr.*, 1900, I, 525).

Booth, Bixby, *Ind. Eng. Chem.*, 1932, **24**, 640 (*Bibl.*).

1-Fluoroheptane (*n*-Heptyl fluoride)



$C_7H_{15}F$

MW, 118

B.p. $120.55^\circ/765$ mm.

Desreux, *Chem. Zentr.*, 1934, II, 2516.

1-Fluorohexane (*n*-Hexyl fluoride)



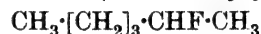
$C_6H_{13}F$

MW, 104

B.p. $93.15^\circ/753$ mm. D_4^{20} 0.8200. n_D^{20} 1.3748.

See previous reference.

2-Fluorohexane (sec.-*n*-Hexyl fluoride)



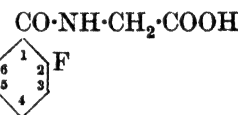
$C_6H_{13}F$

MW, 104

B.p. $86.1-86.2^\circ/758$ mm. D_4^{20} 0.7916. n_D^{20} 1.3693.

See previous reference.

2-Fluorohippuric Acid (*o*-Fluorobenzoyl-glycine)



$C_9H_8O_3NF$

MW, 197

M.p. $121-121.5^\circ$. Sol. EtOH, Et₂O, AcOEt. Mod. sol. $CHCl_3$. Insol. C_6H_6 , CS_2 .

Coppola, *Gazz. chim. ital.*, 1883, **13**, 522.

3-Fluorohippuric Acid (*m*-Fluorobenzoyl-glycine).

Needles from Et₂O. M.p. $152-3^\circ$. Sol. hot H_2O . Spar. sol. $CHCl_3$. Insol. C_6H_6 , CS_2 .

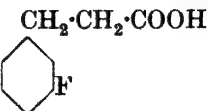
See previous reference.

4-Fluorohippuric Acid (*p*-Fluorobenzoyl-glycine).

Needles from Et₂O. M.p. $161-161.5^\circ$. Insol. C_6H_6 , $CHCl_3$, CS_2 .

See previous reference.

3-Fluorohydrocinnamic Acid

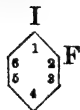


$C_9H_8O_2F$

MW, 168

***o*-Fluoroiodobenzene**

M.p. 46°.

Amide: $C_9H_{10}ONF$. MW, 167. M.p. 95.5°.Schiemann, *Ber.*, 1932, 65, 1438.***o*-Fluoroiodobenzene** C_6H_4FI

MW, 222

M.p. — 41.5°. B.p. 188.6°. Volatile in steam.

Rinkes, *Chem. Zentr.*, 1919, I, 820.***p*-Fluoroiodobenzene.**

Exists in two forms. (i) M.p. — 27.2°.

(ii) M.p. — 18°. B.p. 183.2° (182–4°).

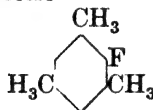
See previous reference and also

Wallach, Hensler, *Ann.*, 1888, 243, 227.**4-Fluoro-3-iodotoluene** C_7H_6FI

MW, 236

B.p. 122–5°/30 mm. D_{20}^{20} 1.8337. n_D^{18} 1.5757.Stoughton, Adams, *J. Am. Chem. Soc.*, 1932, 54, 4429.**Fluoroisopentane.**

See Isoamyl fluoride.

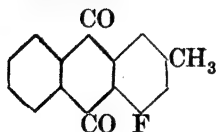
Fluoromesitylene C_7H_7F

MW, 138

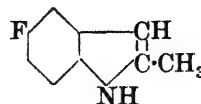
B.p. 171–2°.

Töhl, *Ber.*, 1892, 25, 1525.**Fluoromethane.**

See Methyl fluoride.

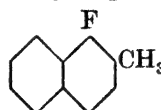
4-Fluoro-2-methylanthraquinone $C_{15}H_9O_2F$

MW, 240

Cryst. from C_6H_6 . M.p. 135.5–137°.Quayle, Reid, *J. Am. Chem. Soc.*, 1925, 47, 2359.**2'-Fluoro-4'-methylbenzophenone-2-carboxylic Acid.**See 2'-Fluoro-*o*-toluylbenzoic Acid.**76 1-Fluoronaphthalene-4-sulphonic Acid****5-Fluoro-2-methylindole** C_9H_8NF

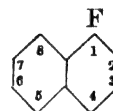
MW, 149

Yellow needles. M.p. 102°.

Schiemann, Winkelmüller, *Ber.*, 1933, 66, 730.**1-Fluoro-2-methylnaphthalene** $C_{11}H_9F$

MW, 160

B.p. 260–2°.

Willstaedt, Scheiber, *Ber.*, 1934, 67, 473.**1-Fluoronaphthalene (α -Fluoronaphthalene)** $C_{10}H_7F$

MW, 146

M.p. — 9 to — 8°. B.p. 212° (215°/756 mm.), 89°/17 mm., 80°/11 mm. Sol. EtOH, AcOH, C_6H_6 , $CHCl_3$. D_4^{18} 1.1332, D_4^{16} 1.141. n_D^{18} 1.59389.*Picrate*: m.p. 113°.Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, 487, 275 (*Bibl.*).Allen, Sugden, *J. Chem. Soc.*, 1932, 762.Nakata, *Ber.*, 1931, 64, 2066.**2-Fluoronaphthalene (β -Fluoronaphthalene).**Cryst. from EtOH. M.p. 61°. B.p. 211.5°/737 mm., 90°/16 mm. Sol. EtOH, AcOH, C_6H_6 , $CHCl_3$. Sublimes.*Picrate*: m.p. 101°.

See last reference above and also

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, 487, 276 (*Bibl.*).**1-Fluoronaphthalene-4-sulphonic Acid** $C_{10}H_7O_3FS$

MW, 226

Cryst. + $\frac{1}{2}H_2O$. M.p. 100°.*Et ester*: $C_{12}H_{11}O_3FS$. MW, 254. M.p. 93°.*Chloride*: $C_{10}H_6O_2FCIS$. MW, 244.5. Cryst.

1-Fluoronaphthalene-5-sulphonic Acid 77

from CHCl_3 . M.p. 86° . B.p. $145-8^\circ/4$ mm., $131.5-132^\circ/0.05$ mm. Sol. EtOH , C_6H_6 , CHCl_3 . Insol. H_2O , pet. ether.

Amide: $\text{C}_{10}\text{H}_8\text{O}_2\text{NFS}$. MW, 225. M.p. 206° .
Anilide: m.p. 144° .

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 277.

1-Fluoronaphthalene-5-sulphonic Acid.

Leaflets + $3(?)\text{H}_2\text{O}$ from H_2O . M.p. $105-6^\circ$.

Me ester: $\text{C}_{11}\text{H}_9\text{O}_3\text{FS}$. MW, 240. Cryst. from Et_2O . M.p. 118° .

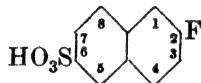
Et ester: prisms from Et_2O . M.p. 79° (74°).

Chloride: prisms. M.p. $122-3^\circ$.

Bromide: $\text{C}_{10}\text{H}_6\text{O}_2\text{FBrS}$. MW, 289. M.p. 145° .

Amide: m.p. $196-7^\circ$.

Mauzelius, *Ber.*, 1889, **22**, 1844.

2-Fluoronaphthalene-6-sulphonic Acid

$\text{C}_{10}\text{H}_7\text{O}_3\text{FS}$ MW, 226

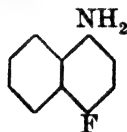
Cryst. + H_2O . M.p. 105° . Hygroscopic.

Chloride: $\text{C}_{10}\text{H}_6\text{O}_2\text{FCIS}$. MW, 244.5. Cryst. from CHCl_3 . M.p. 97° . B.p. $144^\circ/0.05$ mm.

Amide: $\text{C}_{10}\text{H}_8\text{O}_2\text{NFS}$. MW, 225. M.p. 133° .

Anilide: m.p. 129° .

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 279.

4-Fluoro-1-naphthylamine

$\text{C}_{10}\text{H}_8\text{NF}$ MW, 161

M.p. 48° . B.p. $162^\circ/16$ mm. Volatile in steam. Rapidly turns dark violet.

B.HCl : m.p. 280° decomp. (sealed tube).

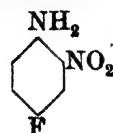
$\text{B}_2\text{H}_2\text{SO}_4$: m.p. 230° .

N-Benzoyl: m.p. 197° .

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 283.

Fluoronitroacetanilide.

See under Fluoronitroaniline.

4-Fluoro-2-nitroaniline

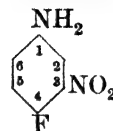
$\text{C}_6\text{H}_5\text{O}_2\text{N}_2\text{F}$ MW, 156

p-Fluoronitrobenzene

Orange prisms. M.p. 92.45° .

N-Acetyl: 4-fluoro-2-nitroacetanilide. $\text{C}_8\text{H}_7\text{O}_2\text{N}_2\text{F}$. MW, 182. Pale yellow prisms. M.p. 71.5° .

Swarts, *Rec. trav. chim.*, 1915, **35**, 142.

4-Fluoro-3-nitroaniline

$\text{C}_6\text{H}_5\text{O}_2\text{N}_2\text{F}$ MW, 156

Orange needles from H_2O . M.p. 98° .

N-Acetyl: 4-fluoro-3-nitroacetanilide. M.p. 138.5° .

Holleman, Beekman, *Rec. trav. chim.*, 1904, **23**, 237.

Swarts, *Rec. trav. chim.*, 1915, **35**, 141.

6-Fluoro-3-nitroaniline.

Yellow needles. M.p. 101.5° .

N-Acetyl: 6-fluoro-3-nitroacetanilide. Cryst. from C_6H_6 . M.p. 178.4° .

Swarts, *Rec. trav. chim.*, 1915, **35**, 142.

Fluoronitroanisole.

See under Fluoronitrophenol.

o-Fluoronitrobenzene

$\text{C}_6\text{H}_4\text{O}_2\text{NF}$ MW, 141

M.p. -5.9° . B.p. 214.6° , $110-12^\circ/22$ mm., $86-7^\circ/11$ mm. $D_4^{17.5} 1.3375$. $n_D^{17.5} 1.5331$.

Schiemann, Pillarsky, *Ber.*, 1929, **62**, 3040.

m-Fluoronitrobenzene.

Exists in three forms. (i) Stable. M.p. 41° . (ii) Labile. M.p. 3.1° . (iii) Labile. M.p. 3.6° . B.p. $200.2^\circ/756$ mm. ($199-200^\circ$), $86^\circ/19$ mm. $D_4^{19} 1.3254$. $n_D^{19} 1.52622$.

Schiemann, Pillarsky, *Ber.*, 1929, **62**, 3041.

Ingold, Vass, *J. Chem. Soc.*, 1928, 421.

Hasselblatt, *Z. physik. Chem.*, 1913, **63**, 23.

p-Fluoronitrobenzene.

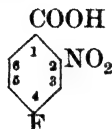
Exists in two forms. (i) Stable. M.p. 27° (26.5°). (ii) Labile. F.p. 21.5° . B.p. $205.3^\circ/735$ mm., $95-97.5^\circ/22$ mm., $86.6^\circ/14$ mm. D_4^{20}

1.3300. n_D^{20} 1.53156. Heat of comb. C_p 701.7 Cal., C_v 702.1 Cal.

Schiemann, Pillarsky, *Ber.*, 1929, **62**, 3040.

Holleman, *Rec. trav. chim.*, 1905, **24**, 25.

4-Fluoro-2-nitrobenzoic Acid (*p*-Fluoro-*o*-nitrobenzoic acid)



$C_7H_4O_4NF$

MW, 185

M.p. 130°.

Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.

5-Fluoro-2-nitrobenzoic Acid.

M.p. 134.5°.

Slothouwer, *Rec. trav. chim.*, 1914, **33**, 336.

6-Fluoro-2-nitrobenzoic Acid.

M.p. 127°. Sol. H_2O .

van Loon, Meyer, *Ber.*, 1896, **29**, 841.

2-Fluoro-3-nitrobenzoic Acid (*o*-Fluoro-*m*-nitrobenzoic acid)



$C_7H_4O_4NF$

MW, 185

Needles. M.p. 160° decomp.

Slothouwer, *Rec. trav. chim.*, 1914, **33**, 335.

4-Fluoro-3-nitrobenzoic Acid.

Needles from H_2O . M.p. 121-2°. $k = 4.33 \times 10^{-4}$ at 25°. The salts have yellow to red col. *Et ester*: $C_9H_8O_4NF$. MW, 213. Yellow cryst. M.p. 45°.

Chloride: $C_7H_5O_3NFCI$. MW, 203.5. B.p. 210°/130 mm.

Amide: $C_7H_5O_3N_2F$. MW, 184. M.p. 153°.

Govaert, *Chem. Abstracts*, 1930, **24**, 2448.

Rouche, *Chem. Abstracts*, 1923, **17**, 2876.

See also previous reference.

6-Fluoro-3-nitrobenzoic Acid.

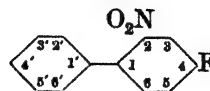
Cryst. from H_2O . M.p. 138-9°. $k = 1.88 \times 10^{-3}$ at 25°.

Et ester: m.p. 49.5°.

See first reference above and also

Slothouwer, *Rec. trav. chim.*, 1914, **33**, 334.

4-Fluoro-2-nitrodiphenyl



$C_{12}H_8O_2NF$

MW, 217

Prisms. M.p. 53-4°. Ox. \rightarrow 4-fluoro-2-nitrobenzoic acid.

van Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.

2'-Fluoro-2-nitrodiphenyl.

M.p. 71.5°. $CrO_3 \rightarrow$ *o*-nitrobenzoic acid.

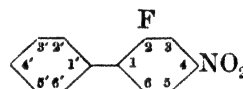
See previous reference.

4'-Fluoro-2-nitrodiphenyl.

Needles. M.p. 59-60°. Ox. \rightarrow *p*-fluorobenzoic acid.

See previous reference.

2-Fluoro-4-nitrodiphenyl



$C_{12}H_8O_2NF$

MW, 217

Needles. M.p. 81°.

van Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.

2'-Fluoro-4-nitrodiphenyl.

Yellow needles. M.p. 74.5°. Ox. \rightarrow *p*-nitrobenzoic acid.

See previous reference.

4'-Fluoro-4-nitrodiphenyl.

Yellow needles from EtOH. M.p. 123° (120-1°). Ox. \rightarrow *p*-nitrobenzoic acid.

Marler, Turner, *J. Chem. Soc.*, 1931, 1361.

See also previous reference.

2-Fluoro-1-nitronaphthalene



$C_{10}H_6O_2NF$

MW, 191

Cryst. from pet. ether. M.p. 49-50°. B.p. 120-4°/12-15 mm.

Willstaedt, Scheiber, *Ber.*, 1934, **67**, 471.

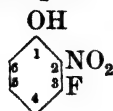
4-Fluoro-1-nitronaphthalene.

Yellow needles from EtOH. M.p. 80°. Sol. most org. solvents.

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 281.

Fluoronitrophenetole.

See under Fluoronitrophenol.

3-Fluoro-2-nitrophenol

MW, 157

Red needles from ligroin. M.p. 39°. Volatile in steam.

Me ether: 3-fluoro-2-nitroanisole. $C_7H_6O_3NF$. MW, 171. Needles from ligroin. M.p. 43.5°.*Benzoyl*: needles. M.p. 114°.Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1880.**4-Fluoro-2-nitrophenol.**

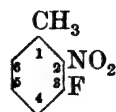
Yellow cryst. from EtOH. M.p. 73.7°.

Me ether: 4-fluoro-2-nitroanisole. Prisms from EtOH. M.p. 61.6°.*Et ether*: 4-fluoro-2-nitrophenetole. $C_8H_8O_3NF$. MW, 185. Needles from EtOH. M.p. 33.7°. B.p. 225-7°.Swarts, *Bulletin de L'Académie Royale de Belgique, Classe des Sciences*, 1913, 278 (*Chem. Abstracts*, 1914, 8, 681).**5-Fluoro-2-nitrophenol.**

Yellow needles from ligroin. M.p. 32°. Volatile in steam.

Me ether: 5-fluoro-2-nitroanisole. Cryst. from ligroin. M.p. 52°.*Benzoyl*: m.p. 110-11°.Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1880.**2-Fluoro-4-nitrophenol**

MW, 157

Me ether: 2-fluoro-4-nitroanisole. $C_7H_6O_3NF$. MW, 171. M.p. 104.6°.*Et ether*: 2-fluoro-4-nitrophenetole. $C_8H_8O_3NF$. MW, 185. M.p. 77°.Schiemann, Miao, *Ber.*, 1933, 66, 1183.**3-Fluoro-4-nitrophenol.**Needles from H_2O or ligroin. M.p. 42°. Non-volatile in steam.*Me ether*: 3-fluoro-4-nitroanisole. Needles from ligroin. M.p. 56.5°.*Benzoyl*: plates. M.p. 118°.Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1880.**3-Fluoro-*o*-nitrotoluene**

MW, 155

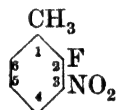
M.p. 17.5-18°. B.p. 92.4-92.8°/12 mm.

Schiemann, *Ber.*, 1929, 62, 1802.**4-Fluoro-*o*-nitrotoluene.**M.p. -8.85°. B.p. 213°/768 mm. (218°), 102.4°/20 mm. D^{20}_D 1.2686. n^{20}_D 1.52358.Desirant, *Chem. Abstracts*, 1933, 27, 4781. van Loon, Meyer, *Ber.*, 1896, 29, 841.**5-Fluoro-*o*-nitrotoluene.**

M.p. 27-8°. B.p. 97-8°/10 mm.

Schiemann, *Ber.*, 1929, 62, 1802.**6-Fluoro-*o*-nitrotoluene.**

M.p. -2°. B.p. 97-97.2°/11 mm.

Schiemann, *Ber.*, 1929, 62, 1805.**2-Fluoro-*m*-nitrotoluene**

MW, 155

B.p. 110-11°/12 mm.

Braun, Rudolf, *Ber.*, 1931, 64, 2471.**4-Fluoro-*m*-nitrotoluene.**M.p. 26.48° (1-2°). B.p. 241°, 134-5°/83 mm., 124.5°/21 mm., 104.2°/9 mm. D^{25}_D 1.2619. n^{25}_D 1.52371.Slothouwer, *Chem. Zentr.*, 1914, II, 1431.Schiemann, *Ber.*, 1929, 62, 1799.Desirant, *Chem. Abstracts*, 1933, 27, 4781.**6-Fluoro-*m*-nitrotoluene.**

M.p. 41.5°. B.p. 99.4-99.6°/13 mm.

Schiemann, *Ber.*, 1929, 62, 1804.**3-Fluoro-*p*-nitrotoluene**

MW, 155

Needles from EtOH. M.p. 53.2°.

Schiemann, *Ber.*, 1929, 62, 1801.

Fluorophenetole.

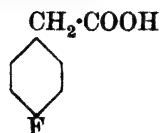
See under Fluorophenol.

***o*-Fluorophenol** C_6H_5OF

MW, 112

M.p. 16.1° . B.p. 151.2° , $52.9^\circ/14$ mm.*Me ether*: *o*-fluoroanisole. C_7H_7OF . MW, 126. M.p. -39° . B.p. $64^\circ/17$ mm., $59.2^\circ/12$ mm.*Et ether*: *o*-fluorophenetole. C_8H_9OF . MW, 140. M.p. -16.7° . B.p. 171.4° , $63.9-64.3^\circ/11$ mm.Schiemann, Miao, *Ber.*, 1933, **66**, 1183.Schiemann, *Z. physik. Chem.*, 1931, **156A**, 417 (*Bibl.*).Rinkes, *Chem. Abstracts*, 1916, **10**, 194.Swarts, *Chem. Abstracts*, 1914, **8**, 680.***m*-Fluorophenol.**M.p. 13.8° . B.p. 177.8° , $108^\circ/70$ mm., $76.8^\circ/14$ mm.*Me ether*: *m*-fluoroanisole. M.p. -35° . B.p. $51^\circ/14$ mm., $47^\circ/12$ mm.*Et ether*: *m*-fluorophenetole. M.p. -27.5° . B.p. 171.4° , $65-65.5^\circ/15$ mm. D^{16}_4 1.0716. n^{16}_D 1.4847.Schiemann, *Z. physik. Chem.*, 1931, **156A**, 414.

See also last reference above.

p*-Fluorophenol.**Exists in two forms. (i) F.p. 46.5° . M.p. 48° . (ii) M.p. $26.5-27^\circ$. B.p. 185.5° , $102.5^\circ/30$ mm., $81.5^\circ/13$ mm.*Me ether*: *p*-fluoroanisole. M.p. -45° . B.p. 157° , $57.2^\circ/19$ mm., $50.7^\circ/13$ mm.*Et ether*: *p*-fluorophenetole. M.p. -8.5° . B.p. 172.8° , $71^\circ/18$ mm. D^{18}_D 1.07148. n^{18}_D 1.48257.Rinkes, *Chem. Abstracts*, 1916, **10**, 194.Swarts, *Chem. Abstracts*, 1914, **8**, 688.p*-Fluorophenylacetic Acid** $C_8H_7O_2F$

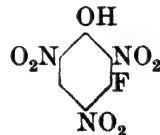
MW, 154

Leaflets from H_2O . M.p. 86° .Dippy, Williams, *J. Chem. Soc.*, 1934, 1466.**2-*m*-Fluorophenylethylamine** (3-*Fluoro-β*-amino-ethylbenzene) $C_8H_{10}NF$

MW, 139

B.p. $87^\circ/15$ mm.*Picrate*: m.p. 157° decomp.Schiemann, *Ber.*, 1932, **65**, 1438.***p*-Fluorophenylhydrazine** $C_6H_7N_2F$

MW, 126

M.p. 39° . B.p. $129.2^\circ/21$ mm.Schiemann, Winkelmueller, *Ber.*, 1933, **66**, 729.**1-*p*-Fluorophenylpropane.**See *p*-Fluoropropylbenzene.**Fluoropicric Acid** (3-*Fluoro-2:4:6-trinitrophenol*) $C_6H_2O_7N_3F$

MW, 247

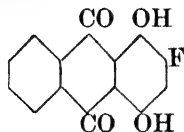
Plates from H_2O . M.p. 173° . Non-volatile in steam.Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1882.**Fluoropropane.**

See Propyl fluoride.

***p*-Fluoropropylbenzene** (1-*p*-Fluorophenylpropane) $C_9H_{11}F$

MW, 138

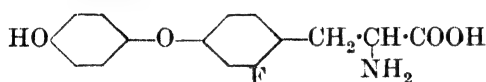
B.p. $164-5^\circ$.Schiemann, Pillarsky, *Ber.*, 1931, **64**, 1344.

2-Fluoroquinizarin (2-Fluoro-1:4-dihydroxyanthraquinone) $C_{14}H_7O_4F$

MW, 258

Red prisms. Bluish-red sol. in KOH.Aq.

Diacetyl: yellow needles from AcOH. M.p. 189°.

Dimroth, Hilcken, *Ber.*, 1921, 54, 3056.**2-Fluorothyronine** (α -Amino- β -p-hydroxyphenoxypheylpropionic acid) $C_{15}H_{14}O_4NF$

MW, 291

Decomp. at 264.5°.

Schiemann, *Ber.*, 1932, 65, 1437.***o*-Fluorotoluene** C_7H_7F

MW, 110

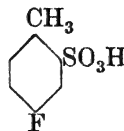
B.p. 114°, 30°/26 mm., 19°/17 mm. D^{13}_D 1.0041. Heat of comb. C_p 901.61 Cal.Holleman, Slothouwer, *Chem. Abstracts*, 1911, 6, 1905.Slothouwer, *Rec. trav. chim.*, 1914, 33, 325.Schiemann, *Ber.*, 1929, 62, 1798.***m*-Fluorotoluene.**B.p. 116°. D^{13}_D 0.9972.

See previous references.

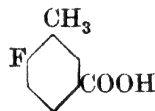
***p*-Fluorotoluene.**B.p. 115.5°/756 mm. D^{16}_D 1.0007. Heat of comb. C_p 901.86 Cal.Holleman, Slothouwer, *Chem. Abstracts*, 1911, 6, 1905.Allen, Sugden, *J. Chem. Soc.*, 1932, 762.Schiemann, *Ber.*, 1927, 60, 1188. **ω -Fluorotoluene.**

See Benzyl fluoride. Addendum Vol. I, p. 693.

Dict. of Org. Comp.—II.

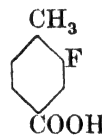
***p*-Fluorotoluene-*o*-sulphonic Acid** $C_7H_7O_3FS$

MW, 190

Chloride: $C_7H_6O_2FCIS$. MW, 208.5. B.p. 145–50°/20 mm.Amide: $C_7H_8O_2NFS$. MW, 189. Prisms from EtOH. M.p. 155° (140°). Sol. EtOH.de Roode, *Am. Chem. J.*, 1891, 13, 219.Holleman, *Rec. trav. chim.*, 1906, 25, 332.**6-Fluoro-*m*-toluic Acid** $C_8H_7O_2F$

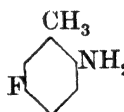
MW, 154

M.p. 165°.

Schiemann, Roselius, *Ber.*, 1932, 65, 745.**2-Fluoro-*p*-toluic Acid** $C_8H_7O_2F$

MW, 154

Cryst. from EtOH.Aq. M.p. 160 1°.

Paternó, Oliveri, *Gazz. chim. ital.*, 1882, 12, 93.**5-Fluoro-*o*-toluidine** C_7H_8NF

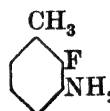
MW, 125

B.p. 94°/17 mm.

N-Benzoyl: m.p. 166°.

N-p-Nitrobenzoyl: m.p. 168°.

Picrate: m.p. 199°.

Schiemann, *Ber.*, 1929, 62, 1803.**2-Fluoro-*m*-toluidine** C_7H_8NF

MW, 125

B.p. 85-7°/12 mm.

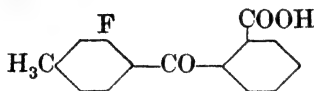
B.HCl: m.p. 197°.

N-Acetyl: 2-fluoro-m-acet-toluidide. B.p. 167-70°/14 mm.

Picrate: m.p. 205°.

Braun, Rudolph, *Ber.*, 1931, **64**, 2471.

2'-Fluoro-o-toluybenzoic Acid (2'-Fluoro-4'-methylbenzophenone-2-carboxylic acid, o-[2-fluoro-4-methyl-benzoyl]-benzoic acid)

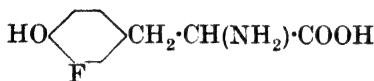


$C_{15}H_{11}O_3F$ MW, 258

Cryst. from C_6H_6 or AcOH. M.p. 129°. $H_2SO_4 \rightarrow$ 4-fluoro-2-methylantraquinone.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, **47**, 2359.

3-Fluorotyrosine



$C_9H_{10}O_3NF$ MW, 199

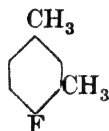
Decomp. at 277°.

Schiemann, *Ber.*, 1932, **65**, 1435.

Fluorotrinitrophenol.

See Fluoropicric Acid.

4-Fluoro-m-xylene



C_8H_9F MW, 124

B.p. 143-4°/749 mm.

Klages, Liecke, *J. prakt. Chem.*, 1900, **61**, 328.

Balz, Schieman, *Ber.*, 1927, **60**, 1188.

Formaldehyde (Methanal)

$H \cdot CHO$

CH_2O MW, 30

M.p. - 92°. B.p. - 21°. D_{20}^{20} 0.815. Stable at temps. below - 30°. Misc. with non-hydroxylic solvents except pet. ether. Heat of polymerisation 15 Cal. The 40% aq. sol. is the "formalin" of commerce. $NaOBr \rightarrow H \cdot COONa$. $NH_3 \rightarrow$ hexamethylenetetramine.

$H_2SO_4 \rightarrow$ polyoxymethylenes. $HCN \rightarrow$ glycollic nitrile. Phenols \rightarrow "phenol-formaldehyde" resins. Reduces $AgNO_3$ and H_2O_2 . $Ox. \rightarrow$ formic acid. Red. \rightarrow methyl alcohol. $R \cdot NH_2 \rightarrow R \cdot N \cdot CH_2$ or $R \cdot NH \cdot CH_2OH$. Caustic alkalis $\rightarrow CH_3OH + H \cdot COONa$. excess alkali or CaO, etc. $\rightarrow \alpha$ -acrose. $C_2H_5OH (+ HCl) \rightarrow C_2H_5 \cdot O \cdot CH_2Cl$. $R \cdot CO \cdot NH_2 \rightarrow R \cdot CO \cdot NH \cdot CH_2OH$ or $CH_2(NH \cdot CO \cdot R)_2$.

Anhydrous polymer: m.p. 170-2°. Sol. 0.017 gm./100 c.c. H_2O at 20°.

Paraformaldehyde: m.p. 121-3°. Sol. 0.24 gm./100 c.c. H_2O at 20°.

Oxime: formaldoxime. CH_3ON . MW, 45. B.p. 84°. Sol. H_2O . Gradually turns to amorph. trimeride insol. H_2O . Hydrochloride: $(CH_3ON)_3 \cdot HCl$. Prisms. M.p. 136°.

Semicarbazone: m.p. 169° decomp. (255-6° decomp.).

Phenylhydrazine: m.p. 145°.

p-Nitrophenylhydrazine: yellow needles from C_6H_6 . M.p. 181-2°.

2:4-Dinitrophenylhydrazine: prisms from ligroin. M.p. 167° (155°).

Ammonia comp.: see Hexamethylenetetramine.

Cyanhydrin: see under Glycollic Acid.

Dimethyl acetal: dimethylformal. See Methylal.

Diethyl acetal: diethylformal, diethoxymethane, ethylal, methylene diethyl ether. $C_5H_{12}O_2$. MW, 104. B.p. 89°. D_0^{20} 0.851. Sol. 11 vols. H_2O at 18°.

Trimeride: metaformaldehyde. See Trioxymethylene.

Walker, *J. Am. Chem. Soc.*, 1933, **55**, 2821; *Ind. Eng. Chem.*, 1931, **23**, 1220 (*Bibl., Review*).

Schwyzer, *Chem. Abstracts*, 1930, **24**, 1181. Coulouma, *Chem. Abstracts*, 1928, **22**, 4105 (*Bibl., Review*).

Trotman, *Chem. Trade J.*, 1928, **82**, 242 (*Review*).

Raschig, Prah, *Ber.*, 1928, **61**, 179.

Bisulphite comp.: $OH \cdot CH_2 \cdot O \cdot SO_2Na$. Cryst. + $1H_2O$ from H_2O . Sol. MeOH. Spar. sol. EtOH. Red. of 2 mols. with $1Zn + AcOH \rightarrow$ sodium formaldehyde-hydrosulphite, "Hyraldite," $(CH_2O)_2Na_2S_2O_4$. Needles from H_2O . Red. of 1 mol. with $1Zn + AcOH \rightarrow$ sodium formaldehyde-sulphoxylate, "Rongalite," "Formosul," $HO \cdot CH_2 \cdot SO_2Na$. Needles from H_2O . The hydrosulphites and sulphoxylates are used in calico-printing for printing vat dyes and for discharging. Zinc formaldehyde-sulphoxylate

(Decroline, zinc Formosul) is also employed in the textile industry as a reducing agent.

Schwartz, Baumann, Sünder, Thesmar, *Bulletin de la société industrielle de Mulhouse*, 1903, **73**, 183.

Bach-Nikolajowa, *Chem. Zentr.*, 1927, **II**, 1014.

Badische, D.R.Ps., 180,529, 168,729.

Schneider, D.R.P., 403,193.

Binz, Râth, Walter, *Ber.*, 1924, **57**, 1398.

Baumann, Thesmar, Frossard, *Bulletin de la société industrielle de Mulhouse*, 1904, **74**, 348.

Dubosc, *Rev. prod. chim.*, 1921, **24**, 11.

Formaldehyde-sulphoxylate.

See under Formaldehyde.

Formaldoxime.

See under Formaldehyde.

Formamide



CH_3ON MW, 45

M.p. 2.5°. B.p. 111°/20 mm., 103°/9 mm. D_4^{20} 1.1334. n_D^{20} 1.4472. Heat of comb. C_p 134.9 Cal. Hygroscopic. Misc. with EtOH. Sol. 1.4 gm./100 c.c. abs. Et₂O at ord. temps. Insol. C₆H₆, CHCl₃, hexane.

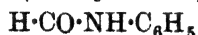
N-Allyl: formylallylamine. C₄H₇ON. MW, 85. B.p. 109°/15 mm. D^0 1.0078.

I.G. (Wietzel), D.R.P., 550,749, (*Chem. Abstracts*, 1932, **26**, 4829).

Smith, *J. Chem. Soc.*, 1931, 3257.

Deschamps, *Chimie et Industrie*, Special No., 1931, 589 (Review); *Chem. Abstracts*, 1931, **25**, 3620.

Formanilide (Formylaniline)



$\text{C}_7\text{H}_7\text{ON}$ MW, 121

Cryst. from ligroin-xylene. M.p. 50°. B.p. 216°/120 mm., 166°/14 mm. D_{20}^{20} 1.1322. Mod. sol. H₂O. Sol. EtOH, C₆H₆. Heat of comb. C_p 861.4 Cal.

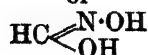
Fröschl, Bomberg, *Monatsh.*, 1927, **48**, 573.

Schmidt, E.P., 252,460, (*Chem. Abstracts*, 1927, **21**, 2273).

Formhydroxamic Acid (Formhydroxamic acid)



or



$\text{CH}_3\text{O}_2\text{N}$ MW, 61

Glistening waxy leaflets. M.p. 82°. Sol.

EtOH, H₂O. Spar. sol. Et₂O. Insol. CHCl₃, ligroin, C₆H₆. $k = 1 \times 10^{-7}$ at 25°. Decomp. above m.p. to CO + NH₂OH. Forms metallic salts.

Me ester: C₂H₅O₂N. MW, 75. Prisms. M.p. 38-9° (99-100°). B.p. 117°/33 mm.

Et ester: C₃H₇O₂N. MW, 89. Needles from CCl₄. M.p. 80°. B.p. 76-7°/15 mm.

Rimini, *Chem. Zentr.*, 1901, **II**, 100.

Jones, Oesper, *Am. Chem. J.*, 1909, **42**, 518.

Houben, *J. prakt. Chem.*, 1922, **105**, 7.

Baudisch, *Chem. Abstracts*, 1925, **19**, 3221.

Formic Acid



CH_2O_2 MW, 46

M.p. 8.4°. B.p. 100.5°, 50°/120 mm. D_4^{20} 1.220. n_D^{20} 1.3714. $k = 2.4 \times 10^{-4}$ at 25°. Heat of comb. (vapour) C_p 69.4 Cal.; (liq.) C_p 61.7 Cal. Vapour burns with blue flame. Liq. is misc. in all proportions with H₂O, EtOH, Et₂O. Mod. sol. C₆H₆. Good solvent for many inorg. and org. comps. Reducing agent.

Me ester: see Methyl formate.

Et ester: see Ethyl formate.

Propyl ester: C₄H₈O₂. MW, 88. B.p. 81°. D_4^{20} 0.9058.

Allyl ester: C₄H₈O₂. MW, 86. B.p. 83°. D^{17} 0.932.

n-Amyl ester: C₆H₁₂O₂. MW, 116. B.p. 130°. D^0 0.9018.

Isoamyl ester: see Isoamyl formate.

Glycerol esters: see Monoformin, Diformin, and Triformin.

Benzyl ester: C₈H₈O₂. MW, 136. B.p. 202-3°/747 mm., 84-5°/10 mm. D^{23} 1.081.

Amide: see Formamide.

Nitrile: see Hydrocyanic acid.

Anilide: see Formanilide.

Toluidide: see Formo-toluidide.

Pryanishnikov, Shakhova, *Chem. Abstracts*, 1933, **27**, 2672.

Sucharda, Mazonski, *ibid.*, 5954.

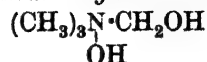
I.G., F.P. 718,672, (*Chem. Abstracts*, 1932, **26**, 3261).

Cie de Bethune, F.P. 673,337, (*Chem. Abstracts*, 1930, **24**, 2474).

Formin.

See Hexamethylenetetramine.

Formocholine (Hydroxytrimethylaminome-thanol, trimethylhydroxymethylammonium hydroxide, hydroxytetramethylammonium hydroxide)



$\text{C}_4\text{H}_{13}\text{O}_2\text{N}$

MW, 107

Hygroscopic cryst. mass. Absorbs CO_2 from the air.

Iodide: acetyl deriv., acetoxytetramethylammonium iodide, $(\text{CH}_3)_3\text{NI} \cdot \text{CH}_2\text{O} \cdot \text{CO} \cdot \text{CH}_3$. Needles from EtOH. M.p. 152° .

Platinichloride: $[(\text{CH}_3)_3\text{N} \cdot \text{CH}_2\text{OH}]_2, \text{PtCl}_6$. M.p. 230° decomp.

Me ether: platinichloride:

$[(\text{CH}_3)_3\text{N} \cdot \text{CH}_2\text{OCH}_3]_2, \text{PtCl}_6$.

Prisms. M.p. 234° decomp. **Aurichloride**: $[(\text{CH}_3)_3\text{N} \cdot \text{CH}_2\text{OCH}_3]_2, \text{AuCl}_4$.

M.p. $235-6^\circ$ ($135-6^\circ$). **Iodide**: $\text{C}_6\text{H}_{14}\text{ONI}$. MW, 231. M.p. 84° . **Picrate**: m.p. 198° .

Et ether: platinichloride: m.p. $241-2^\circ$. **Aurichloride**: m.p. $138-9^\circ$. **Iodide**: $\text{C}_6\text{H}_{16}\text{ONI}$. MW, 245. M.p. 94° .

Propyl ether: platinichloride: m.p. $236-7^\circ$. **Aurichloride**: m.p. 114° . **Iodide**: $\text{C}_7\text{H}_{18}\text{ONI}$. MW, 259. M.p. 108° .

Butyl ether: platinichloride: m.p. $243-4^\circ$. **Aurichloride**: m.p. 81° . **Iodide**: $\text{C}_8\text{H}_{20}\text{ONI}$. MW, 273. M.p. 98° .

Schmidt, Litterscheld, *Ann.*, 1904, **337**, 74.

Ewins, *Biochem. J.*, 1914, **8**, 371.

Renshaw, Ware, *J. Am. Chem. Soc.*, 1925, **47**, 2990.

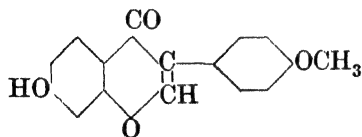
Formodiphenylamide.

See Formyldiphenylamine.

Formonitrile.

See Hydrocyanic Acid.

Formo-ononetin (7-Hydroxy-4'-methoxyisoflavone)



$\text{C}_{16}\text{H}_{12}\text{O}_4$ MW, 268

The aglucone from ononin. Cryst. M.p. 257° .

Me ether: dimethyldaidzein. See under Daidzein. A more recent m.p. gives $162-4^\circ$.

Wessely, Kornfeld, Lechner, *Ber.*, 1933, **66**, 685.

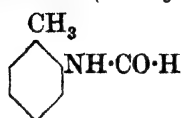
Formophenetidide.

See under Phenetidine.

Formosul.

See under Formaldehyde.

Formo-o-toluidide (Formyl-o-toluidine)



$\text{C}_8\text{H}_9\text{ON}$

MW, 135

Leaflets from EtOH. M.p. 62° (57°). B.p. 288° . Very sol. EtOH.

Hirst, Cohen, *J. Chem. Soc.*, 1895, **67**, 830.

Formo-m-toluidide (Formyl-m-toluidine).

B.p. $278^\circ/724$ mm. (part. decomp.).

Niementowski, *Ber.*, 1887, **20**, 1892.

Formo-p-toluidide (Formyl-p-toluidine).

Needles. M.p. 53° (45°). Very sol. EtOH. Sol. H_2O .

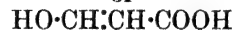
Hirst, Cohen, *J. Chem. Soc.*, 1895, **67**, 830.

Hübner, Rudolph, *Ann.*, 1881, **209**, 372.

Formylacetic Acid (Malonaldehydic acid, aldehydoacetic acid, 2-hydroxyacrylic acid, malonic semi-aldehyde)



or



$\text{C}_3\text{H}_4\text{O}_3$

MW, 88

Neither the free acid nor its methyl or ethyl esters have been isolated.

Nitrile: see Cyanoacetaldehyde.

Oxime: see Isonitrosopropionic Acid.

Semicarbazone: m.p. 116° decomp.

Me ester diethyl acetal: methyl 2:2-diethoxypropionate. $\text{C}_8\text{H}_{16}\text{O}_4$. MW, 176. B.p. 193° .

Et ester: oxime, m.p. $57-9^\circ$. **Semicarbazone**: m.p. $147-8^\circ$.

Et ester diethyl acetal: ethyl 2:2-diethoxypropionate. $\text{C}_9\text{H}_{18}\text{O}_4$. MW, 190. B.p. $93^\circ/22$ mm.

Rinkes, *Rec. trav. chim.*, 1927, **46**, 273.

Straus, Voss, *Ber.*, 1926, **59**, 1681.

Claisen, *Ber.*, 1903, **36**, 3666.

Wohl, Emmerich, *Ber.*, 1900, **33**, 2763.

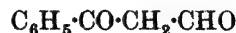
Formylacetone.

See Acetoacetaldehyde.

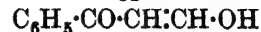
Formylacetoneitrile.

See Cyanoacetaldehyde.

ω -Formylacetophenone (ω -Aldehydoacetophenone, benzoylacetalddehyde, benzoylviny alcohol, hydroxymethyleneacetophenone, hydroxyvinyl phenyl ketone, phenacyl aldehyde, phenacyl form-aldehyde)



or



$\text{C}_9\text{H}_8\text{O}_2$

MW, 148

Yellow unstable oil. Resinifies readily. FeCl_3 on EtOH sol. \rightarrow intense red col. Forms stable Na and Cu derivs. Heat in AcOH \rightarrow 1:3:5-tribenzoylbenzene.

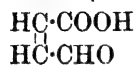
Oxime: benzoylacetaldoxime. Prisms from C_6H_6 . M.p. 86–7°.

Stähler, *Ber.*, 1914, **47**, 590.

Mumm, Münchmeyer, *Ber.*, 1910, **43**, 3338.

Bülöw, Sicherer, *Ber.*, 1901, **34**, 3891.

Formylacrylic Acid (Maleic semi-aldehyde)



$C_4H_4O_3$ MW, 100

Needles from $Et_2O \cdot C_6H_6$. M.p. 55°. B.p. 145°/10 mm. slight decomp. Very sol. H_2O , $EtOH$, Et_2O . Spar. sol. $CHCl_3$, C_6H_6 . Insol. ligroin.

Et ester: 2:4-dinitrophenylhydrazones, m.p. 290–2°.

Oxime: cryst. from Et_2O . M.p. 130–40° decomp.

Phenylhydrazone: citron yellow needles. M.p. 158–9°.

Fecht, *Ber.*, 1905, **38**, 1272.

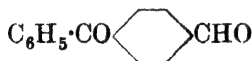
Formylallylamine.

See under Formamide.

Formylaniline.

See Formanilide.

p-Formylbenzophenone (4-Aldehydobenzophenone, benzophenone-4-aldehyde, 4-benzoylbenzaldehyde)



$C_{14}H_{10}O_2$ MW, 210

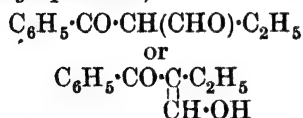
Pearly plates from H_2O . M.p. 64°. Very sol. H_2O , $EtOH$, Et_2O , $CHCl_3$. Insol. C_6H_6 , pet. ether. Forms bisulphite comp.

Bourcet, *Bull. soc. chim.*, 1896, **15**, 950.

Formylbenzyl cyanide.

See under Phenylformylacetic Acid.

β-Formylbutyrophenone (β-Aldehydobutyrophenone, α-benzoylbutyraldehyde, β-hydroxymethylenebutyrophenone)

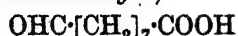


$C_{11}H_{12}O_2$ MW, 176

Leaflets from dil. $EtOH$. M.p. 87–9°. B.p. 260–2° decomp.

Bishop, Claisen, Sinclair, *Ann.*, 1894, **281**, 397.

7-Formylcaprylic Acid (7-Aldehydo-octioic acid, azelaic semi-aldehyde)



$C_9H_{16}O_3$ MW, 172

M.p. 57–63° (70°). B.p. 181–2°/15 mm. Sol. ord. org. solvents. Insol. H_2O .

Trimeride: cryst. from Me_2CO . M.p. 112–13°.

Me ester: $C_{10}H_{18}O_3$. MW, 186. B.p. 111–12°/3 mm. (140–5°/15 mm.). D_4^{20} 0.9704. n_D^{20} 1.4384. *Semicarbazone*: m.p. 104–5° (162–3°).

Trimeride: cryst. from pet. ether. M.p. 34–6°.

Di-Me acetal: $C_{12}H_{24}O_4$. MW, 232. B.p. 148–50°/14 mm. D_4^{20} 0.9379. n_D^{20} 1.4312.

Et ester di-Et acetal: $C_{15}H_{30}O_4$. MW, 274. B.p. 158–60°/14 mm.

Semicarbazone: m.p. 163°.

Fischer, Düll, Ertal, *Ber.*, 1932, **65**, 1471.

Noller, Adams, *J. Am. Chem. Soc.*, 1926, **48**, 1074.

Helferich, Schäfer, *Ber.*, 1924, **57**, 1911.

Haller, Brochet, *Compt. rend.*, 1910, **150**, 496.

p-Formylcinnamic Acid (4-Aldehydocinnamic acid)



$C_{10}H_8O_3$ MW, 176.

Prisms or needles. M.p. 247°. Sublimes. Sol. hot $AcOH$. Spar. sol. Et_2O , $CHCl_3$, hot H_2O .

Me ester: $C_{11}H_{10}O_3$. MW, 190. Cryst. from Et_2O . M.p. 82–3°.

Löw, *Ann.*, 1885, **231**, 375.

Ephraim, *Ber.*, 1901, **34**, 2784.

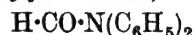
Formyldiethylamine.

See N-Diethylformamide.

Formyldimethylamine.

See Dimethylformamide.

Formyldiphenylamine (Formodiphenylamide, N-diphenylformamide)

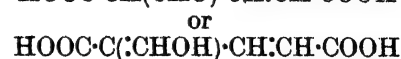
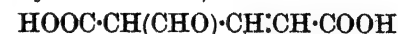


$C_{13}H_{11}ON$ MW, 197

Cryst. from $EtOH.Aq$. M.p. 73–4°. B.p. 190°/13 mm. Sol. $EtOH$, C_6H_6 . Insol. H_2O .

Tobias, *Ber.*, 1882, **15**, 2866.

3-Formylglutaconic Acid (3-Hydroxymethyleneglutaconic acid)



$C_6H_6O_5$ MW, 158

The free acid has not been characterized.

Di-Me ester: $C_8H_{10}O_5$. MW, 186. Needles. M.p. 88–9°. Sol. Et_2O . Spar. sol. $CHCl_3$, C_6H_6 . Insol. ligroin.

Di-Et ester: $C_{10}H_{14}O_5$. MW, 214. Leaflets from Et_2O or C_6H_6 . M.p. 66–7°. Sol. ord. org. solvents. $FeCl_3 \rightarrow$ bluish-violet col. On standing in moist air or heating above m.p. changes to oily dimeride which with $FeCl_3 \rightarrow$ red col. Heat at 120° \rightarrow trimesic ester + ethyl acetate + formic acid.

Wislicenus, Wrangell, *Ann.*, 1911, **381**, 367, 376.

Formylglycine (Formylaminoacetic acid)



$C_3H_5O_3N$ MW, 103

Leaflets from H_2O or $EtOH$. M.p. 153–4° decomp. Very sol. hot H_2O , $EtOH$. Spar. sol. Me_2CO , $AcOEt$. Very spar. sol. Et_2O , C_6H_6 .

Chloride: $C_3H_4O_2NCl$. MW, 121.5. Cryst. from acetyl chloride. Decomp. at 100°. Sol. hot $CHCl_3$, C_6H_6 . Spar. sol. Et_2O .

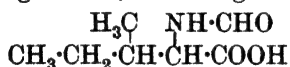
Fischer, Warburg, *Ber.*, 1905, **38**, 3999.

Max, *Ann.*, 1909, **369**, 285.

Formylglycollic Acid.

See Hydroxypyruvic Acid.

Formyl-isoleucine (Note. The *d*- and *l*- refer to configuration, not to sign of rotation)



$C_7H_{13}O_3N$ MW, 159

d-.

Cryst. from $EtOH$. M.p. 156–7° (sinters at 154°). $[\alpha]_D^{20} - 26.8^\circ$ in $EtOH$.

l-.

Cryst. from $EtOH$. M.p. 156–7° (sinters at 154°). $[\alpha]_D^{20} + 26.6^\circ$ in $EtOH$.

dl-.

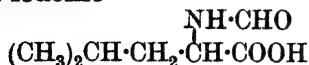
Cryst. from H_2O . M.p. 121–2°.

Et ester: $C_9H_{17}O_3N$. MW, 187. B.p. 163°/17 mm. D_4^{20} 1.056.

Abderhalden, Zeisset, *Z. physiol. Chem.*, 1931, **195**, 121.

Locquin, *Bull. soc. chim.*, 1907, **4**, 598.

Formyl-leucine



$C_7H_{13}O_3N$ MW, 159

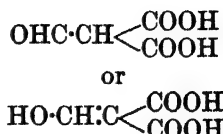
dl-.

Prisms from H_2O . M.p. 115–16°. Very sol. $EtOH$, hot H_2O . Spar. sol. Et_2O , $CHCl_3$, C_6H_6 . Insol. pet. ether.

Fischer, Warburg, *Ber.*, 1905, **38**, 3998.

Fischer, *Ber.*, 1906, **39**, 2928.

Formylmalonic Acid (Hydroxymethylene-malonic acid)



$C_4H_4O_5$

MW, 132

The free acid has not been isolated.

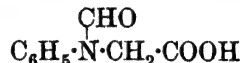
Di-Et ester: $C_8H_{12}O_5$. MW, 188. B.p. 217–19°, 107–9°/12 mm. D_4^{20} 1.127. n_D^{20} 1.456. $FeCl_3$ on $EtOH$ sol. \rightarrow orange-red col. Hyd. by alkalis \rightarrow formic + malonic acids. *Ba deriv.*: $(C_8H_{11}O_5)_2Ba$. M.p. 119° (138° anhyd.).

Auwers, *Ann.*, 1918, **415**, 222.

Formylnaphthoic Acid.

See Naphthaldehydic Acid.

Formylphenylglycine (Phenylformylaminoacetic acid)



$C_9H_9O_3N$

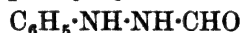
MW, 179

Needles from H_2O . M.p. 125°. Sol. $EtOH$, Et_2O . Mod. sol. cold H_2O .

Et ester: $C_{11}H_{13}O_3N$. MW, 207. B.p. 290–5°.

Vorländer, Mumme, *Ber.*, 1901, **34**, 1648.

β -Formylphenylhydrazine



$C_7H_8ON_2$

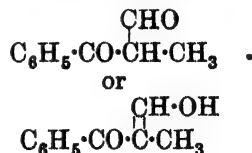
MW, 136

Leaflets from $EtOH$. M.p. 146°. Very sol. dil. aq. alkalis. Sol. $EtOH$, hot H_2O . Spar. sol. C_6H_6 , $CHCl_3$, cold H_2O .

Claisen, *Ann.*, 1895, **287**, 369.

Willstätter, Stoll, *Ber.*, 1909, **42**, 4874.

β -Formylpropiophenone (1-Benzoylpropionaldehyde, 1-formylethyl phenyl ketone, β -hydroxymethylenepropiophenone)



$C_{10}H_{10}O_2$

MW, 162

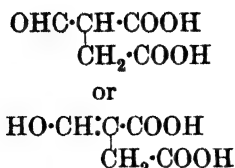
Needles from dil. $EtOH$. M.p. 118–19°. B.p. 155°/25 mm. Sol. $MeOH$, $EtOH$, C_6H_6 , hot H_2O . Spar. sol. Et_2O , CS_2 . Very spar. sol. ligroin. $FeCl_3$ on $EtOH$ sol. \rightarrow deep violet col.

Reynolds, *Am. Chem. J.*, 1910, **44**, 313.

Formylprotocatechuic Acid.

See Isonoropanic Acid.

Formylsuccinic Acid (*Hydroxymethylene-succinic acid*)



$\text{C}_5\text{H}_6\text{O}_5$

MW, 146

The free acid has not been isolated.

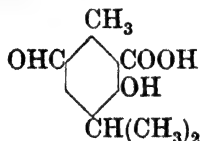
Di-Me ester: $\text{C}_7\text{H}_{10}\text{O}_5$. MW, 174. B.p. 112–15°. *Cu salt*: $(\text{C}_7\text{H}_9\text{O}_5)_2\text{Cu}\cdot\text{H}_2\text{O}$. Needles from MeOH. M.p. 133–5°.

Di-Et ester: $\text{C}_9\text{H}_{14}\text{O}_5$. MW, 202. *Aldo-form*: b.p. 134–40°/19 mm. *Enol-form*: b.p. 145–51°/19 mm. *Equilibrium-mixture*: b.p. 128–48°/15 mm. FeCl_3 on EtOH sol. \rightarrow cherry-red col. Hyd. by acids or alkalis \rightarrow $\text{C}_2\text{H}_5\text{OH}$ + formic + succinic acids. *Semicarbazone*: m.p. 126°. *p-Nitrophenylhydrazone*: m.p. 100°. *Cu salt*: $(\text{C}_9\text{H}_{13}\text{O}_5)_2\text{Cu}$. Needles from EtOH. M.p. 132–3° (EtOH-free). *Ni salt*: $(\text{C}_9\text{H}_{13}\text{O}_5)_2\text{Ni}$. Needles from EtOH. M.p. 219–20°.

Carrière, *Ann. chim.*, 1922, 17, 41.

Johnson, Peck, Ambler, *J. Am. Chem. Soc.*, 1911, 33, 761.

Formylthymotinic Acid (*3-Hydroxy-4-isopropyl-6-aldehydo-o-toluic acid*)



$\text{C}_{12}\text{H}_{14}\text{O}_4$

MW, 222

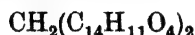
Cryst. from dil. EtOH. M.p. 180–5°.

Heyl, Meyer, *Ber.*, 1895, 28, 2796.

Formylveratric Acid.

See Opianic Acid and Iso-opianic Acid.

Fortoin (*Methylene-dicotoin*. See Cotoin)



$\text{C}_{29}\text{H}_{24}\text{O}_8$

MW, 500

Yellow cryst. with cinnamon-like odour. M.p. 211–13° decomp. (128°). Sol. alkalis, AcOH, Me_2CO , CHCl_3 . Spar. sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O .

Jodlbauer, Kurz, *Biochem. Z.*, 1916, 74, 351.

Boehm, *Ann.*, 1904, 329, 276.

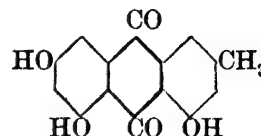
Overlach, *Chem. Zentr.*, 1900, I, 872.

Zimmer, D.R.P., 104,362, (*Chem. Zentr.*, 1899, II, 951).

Fragarol.

See under 2-Naphthol.

Frangula-emodin (*4 : 5 : 7-Trihydroxy-2-methylantraquinone*)



$\text{C}_{15}\text{H}_{10}\text{O}_5$

MW, 270

Aglucone obtained by hydrolysis of frangulin. Orange needles from Py.Aq. M.p. 256–7°.

Triacetyl: m.p. 193–4°.

Jacobson, Adams, *J. Am. Chem. Soc.*, 1924, 46, 1312.

Frangulin (*Franguloside*)

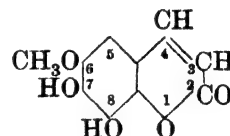
$\text{C}_{21}\text{H}_{20}\text{O}_9$

MW, 416

Glucoside of alder buckthorn bark. Orange needles + H_2O from Py.Aq. M.p. 246–9° (turns red at 197°). $[\alpha]_D - 134^\circ$ in 80% AcOH. Acid hyd. \rightarrow rhamnose + frangula-emodin.

Bridel, Charaux, *Bull. soc. chim. biol.*, 1933, 15, 642.

Fraxetin (*7 : 8-Dihydroxy-6-methoxy-coumarin*)



$\text{C}_{10}\text{H}_8\text{O}_5$

MW, 208

Aglucone obtained by hydrolysis of fraxin. Plates from EtOH.Aq. M.p. 227–8° (turns yellow at 150°). Sol. EtOH, HCl.Aq. Spar. sol. Et_2O , boiling H_2O . $\text{FeCl}_3 \rightarrow$ greenish-blue col.

Me ether: 8-hydroxy-6 : 7-dimethoxy-coumarin. $\text{C}_{11}\text{H}_{10}\text{O}_5$. MW, 222. M.p. 195°.

Et ether: 8-hydroxy-6-methoxy-7-ethoxycoumarin. $\text{C}_{12}\text{H}_{12}\text{O}_5$. MW, 236. M.p. 153–4°.

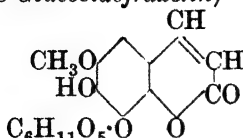
Di-Me ether: 6 : 7 : 8-trimethoxycoumarin. $\text{C}_{13}\text{H}_{12}\text{O}_5$. MW, 236. M.p. 103–4°. B.p. 90–100°/0.2 mm.

Me-Et ether: 6 : 7-dimethoxy-8-ethoxycoumarin. $\text{C}_{13}\text{H}_{14}\text{O}_5$. MW, 250. M.p. 108–5°.

Di-Et ether: 6-methoxy-7 : 8-diethoxycoumarin. $\text{C}_{14}\text{H}_{16}\text{O}_5$. MW, 264. M.p. 81–2°.

Wessely, Lechner, *Monatsh.*, 1932, 60, 159.

Wessely, Demmer, *Ber.*, 1929, 62, 120; 1928, 61, 1279.

Fraxin (8-Glucosidofraxetin) $C_{16}H_{18}O_{10}$

MW, 370

Glucoside of ash, *Fraxinus Excelsior*, Linn., and other plants. Yellowish needles from EtOH. M.p. 205°. Dil. alk. sols. fluor. bluish-green.

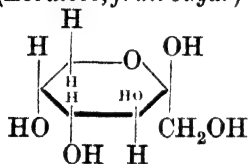
See previous references.

Freund's Acid.

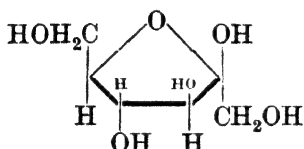
See 1-Naphthylamine-3 : 6-disulphonic Acid.

Fritzsche's Reagent.

See 2 : 7-Dinitroanthraquinone.

Fructose (Levulose, fruit sugar)

Fructopyranose



Fructofuranose

 $C_6H_{12}O_6$

MW, 180

The furanose modification is known only in the form of its derivatives.

Pyranose form :*d*-.

Occurs in a large variety of fruits, etc. Prisms from EtOH. M.p. 102-4° decomp. Very sol. H₂O. Sol. 12 parts EtOH at 18°. Sol. Me₂CO. Mod. sol. Py. $[\alpha]_D^{20} - 133^\circ$ initial, -92° final, in 10% aq. sol. Heat of comb. C_p 671.6 Cal. NaHg \rightarrow *d*-mannitol + *d*-sorbitol. Oxidises rapidly in alk. sol. Reduces alk. Cu salts more rapidly than any other naturally occurring sugar.

α -Methylglucoside : C₇H₁₄O₆. MW, 194. M.p. 102°. $[\alpha]_D^{20} + 92.76^\circ$ in EtOH. Tetra-acetyl : m.p. 112°. $[\alpha]_D^{20} + 45.0^\circ$ in CHCl₃.

β -Methylglucoside : m.p. 119-20°. $[\alpha]_D^{20} - 172.1^\circ$ in H₂O. Tetra-acetyl : m.p. 75-6°. $[\alpha]_D - 124.4^\circ$ in CHCl₃. Tetra-benzoyl : m.p. 113°. $[\alpha]_D^{20} - 171.8^\circ$ in CHCl₃. Tetra-Me ether : C₁₁H₂₂O₆. MW, 250. M.p. 33-4°. B.p. 105-6°/0.06 mm. $[\alpha]_D^{17} - 149.1^\circ$ in H₂O.

1 : 3 : 4 : 5-Tetra-Me ether : C₁₀H₂₀O₆. MW, 236. M.p. 98-9°. B.p. 139-41°/12 mm. $[\alpha]_D^{20} - 121.3^\circ$ in H₂O.

1 : 3 : 4 : 5-Tetra-acetyl : m.p. 127-9°. $[\alpha]_D - 109^\circ$ in CHCl₃.

Penta-acetyl : α -form, m.p. 70°. $[\alpha]_D^{20} + 34.75^\circ$ in CHCl₃. β -Form : m.p. 108-9°. $[\alpha]_D^{20} - 120.5^\circ$ in CHCl₃.

1 : 2 : 4 : 5- α -Di-acetone deriv. : m.p. 119-20°. $[\alpha]_D^{20} - 162.8^\circ$ in H₂O.

2 : 3 : 4 : 5- β -Di-acetone deriv. : m.p. 97°. B.p. 110-15°/0.17-0.5 mm. $[\alpha]_D^{22} - 32.9^\circ$ in H₂O.

p-Nitrophenylhydrazone : m.p. 176°. $[\alpha]_D + 16^\circ$ in Py-EtOH.

Phenylosazone : *d*-glucosazone, *d*-mannosazone. M.p. 210°.

2 : 4-Dichlorophenylosazone : m.p. 120°.

Haworth, Hirst, Learner, *J. Chem. Soc.*, 1927, 1040.

Hudson, Brauns, *J. Am. Chem. Soc.*, 1916, 38, 1216; 1915, 37, 2736.

Schlubach, Schroter, *Ber.*, 1930, 63, 367.

Brigl, Schinle, *Ber.*, 1933, 66, 327.

Butler, Cretcher, *J. Am. Chem. Soc.*, 1929, 51, 3161.

Fischer, Taube, *Ber.*, 1927, 60, 485.

I.G., D.R.P., 574,803, (*Chem. Abstracts*, 1933, 27, 4714).

Furanose form :

Methylglucoside : syrup. $[\alpha]_D + 26.6^\circ$ in H₂O.

Tetra-Me ether : C₁₁H₂₂O₆. MW, 250. B.p. 93-4°/0.03 mm. $[\alpha]_D + 48.8^\circ$ in H₂O. Tetra-carbomethoxyl : b.p. 226-7°/0.1 mm. $[\alpha]_D + 19.8^\circ$ in Me₂CO.

Ethylglucoside : C₈H₁₆O₆. MW, 208. Syrup. $[\alpha]_D + 28^\circ$ in EtOH.

1 : 3 : 4 : 6-Tetra-acetyl : syrup. $[\alpha]_D + 38.7^\circ$ in C₆H₆.

3 : 4 : 6-Tri-Me ether : C₉H₁₈O₆. MW, 222. B.p. 115°/0.02 mm. (146°/0.37 mm.). $[\alpha]_D^{15} + 30.51^\circ$ in H₂O.

1 : 3 : 4 : 6-Tetra-Me ether : b.p. 95-7°/0.01 mm. $[\alpha]_D^{19} + 31.3^\circ$ in H₂O.

Avery, Haworth, Hirst, *J. Chem. Soc.*, 1927, 2308.

Allpress, Haworth, Inkster, *ibid.*, 1233.

l-.

Dextrorotatory syrup. Does not ferment.

Phenylosazone : *l*-glucosazone, *l*-mannosazone. M.p. 208°.

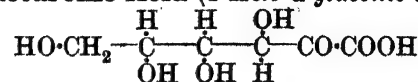
Fischer, *Ber.*, 1890, 23, 389.

dl-.

See α -Acrose.

Fructosone.

See Glucosone.

Fructuronic Acid (1-Keto-*d*-gluconic acid) $C_6H_{10}O_7$

MW, 194

Characteristic sterol of seaweeds. Needles from MeOH. M.p. 124°. Sol. most org. solvents. $[\alpha]_D^{20} - 38.4^\circ$ in CHCl_3 . $\text{H} \rightarrow$ stigmatanol. Adds 2 mols. Br. SbCl_3 in $\text{CHCl}_3 \rightarrow$ red col. on standing.

Acetyl deriv.: m.p. 119°. *Tetrabromo deriv.*, m.p. 133°.

Propionyl deriv.: m.p. 105–6°.

Benzoyl deriv.: m.p. 119–20°.

Heilbron, Phipers, Wright, *J. Chem. Soc.*, 1934, 1572.

Fucoxanthin

$\text{C}_{40}\text{H}_{56}\text{O}_6$ ($\text{C}_{40}\text{H}_{60}\text{O}_6$) MW, 632 (636)

Carotenoid colouring matter from brown algæ. Brownish-red prisms from Et_2O -pet. ether. M.p. 168° (160°). Sol. Et_2O , MeOH. Gives deep blue col. with conc. H_2SO_4 . Adds 10H_2 per mol. on treatment with H (+ Pt black).

Hydrochloride: $\text{C}_{40}\text{H}_{56}\text{O}_6 \cdot 4\text{HCl}$. M.p. 215° (not sharp).

Iodide: violet-black prisms. M.p. 134–5°.

Karrer *et al.*, *Helv. Chim. Acta*, 1931, 14, 622.

Heilbron, Phipers, *Biochem. J.*, 1935, 29, 1369.

Fukugenetin

$\text{C}_{19}\text{H}_{14}\text{O}_7$ MW, 354

One of the products of action of 50% KOH.Aq. on fukugetin in atmosphere of H. M.p. 205°.

Acetyl deriv.: m.p. 265°.

Tetra-Me ether: $\text{C}_{23}\text{H}_{22}\text{O}_7$. MW, 410. M.p. 204°.

Tetra-Et ether: $\text{C}_{27}\text{H}_{30}\text{O}_7$. MW, 466. M.p. 171–2°.

Shinoda, *Chem. Zentr.*, 1933, I, 1453.

Fukugetin

$\text{C}_{22}\text{H}_{16}\text{O}_8$ (+ $2\text{H}_2\text{O}$) MW, 408 (444)

Occurs in bark of *Garcinia spicata*. KOH fusion \rightarrow phloroglucinol. Isomeric with garcinin.

Penta-Me ether: $\text{C}_{27}\text{H}_{26}\text{O}_8 + 1\frac{1}{2}\text{H}_2\text{O}$. MW, 505. Decomp. at 141–2°.

Murakami, *Chem. Zentr.*, 1934, II, 2394.

Murakami, Irie, *British Chemical Abstracts*, 1935, 220A.

Fulminic Acid (Carbyloxime)

$\text{C:N}\cdot\text{OH}$

CHON

MW, 43

The free acid is stable for a time only in Et_2O sol. at low temps. It tends to polymerise very

rapidly. Monomolecular esters cannot be prepared. The salts are explosive and some are powerful detonators.

Trimolecular Me ester: $[\text{C:NO}\cdot\text{CH}_3]_3$. MW, 171. Needles from boiling H_2O . M.p. 149°.

Mercury fulminate: $\text{Hg}(\text{O}\cdot\text{N}\cdot\text{C})_2$. Needles from H_2O or EtOH. Heat of decomp. 408 cal./gm.

Silver fulminate: $\text{AgO}\cdot\text{N}\cdot\text{C}$. Needles from hot H_2O . Is extraordinarily explosive.

Copper fulminate: $\text{CuO}\cdot\text{N}\cdot\text{C}$. Greenish-grey powder. Heat of decomp. 508 cal./gm.

Cadmium fulminate: $\text{CdO}\cdot\text{N}\cdot\text{C}$. Cryst. Sol. MeOH. Mod. sol. EtOH. Very sol. H_2O with rapid decomp. Heat of decomp. 470 cal./gm.

Thallium fulminate: $\text{TlO}\cdot\text{N}\cdot\text{C}$. Needles. Sol. H_2O with decomp. Heat of decomp. 223 cal./gm.

Sodium fulminate: $\text{NaO}\cdot\text{N}\cdot\text{C}$. Prisms from H_2O . Explodes on rubbing or heating.

Potassium fulminate: $\text{KO}\cdot\text{N}\cdot\text{C}$. Prisms from MeOH. More hygroscopic than Na salt.

Wieland, Hess, *Ber.*, 1909, 42, 1346.

Wieland, *Ber.*, 1910, 43, 3362.

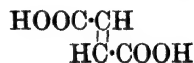
Palazzo, *Gazz. chim. ital.*, 1913, 43, I, 563.

Pauling, Hendricks, *J. Am. Chem. Soc.*, 1926, 48, 645.

Wöhler, Weber, *Ber.*, 1929, 62, 2742.

Wöhler, Berthmann, *ibid.*, 2748.

Fumaric Acid (trans-Ethylene-1 : 2-dicarboxylic acid)



$\text{C}_4\text{H}_4\text{O}_4$ MW, 116

Prisms or needles. M.p. 300–2° (286–7°, 282–4°) in sealed tube. Sublimes above 200° in open vessels: at 230° \rightarrow maleic anhydride. Sol. 150 parts H_2O at 16°. Sol. EtOH. Spar. sol. Et_2O , Me_2CO . Insol. C_6H_6 . k (first) = 9.3×10^{-4} at 25°; (second) = 2.9×10^{-5} at 25°. Heat of comb. C_p 320 Cal. Heat with H_2O at 150–70° in sealed tube \rightarrow dl-maleic acid. Ox. \rightarrow racemic acid.

Mono-Me ester: $\text{C}_5\text{H}_6\text{O}_4$. MW, 130. Prisms from EtOH. M.p. 144.5°.

Di-Me ester: $\text{C}_6\text{H}_8\text{O}_4$. MW, 144. M.p. 102°. B.p. 192°. Sublimes at ord. temp.

Mono-Et ester: $\text{C}_6\text{H}_8\text{O}_4$. MW, 144. Plates. M.p. 70°. B.p. 147°/16 mm.

Di-Et ester: $\text{C}_8\text{H}_{12}\text{O}_4$. MW, 172. B.p. 213–15°, 99°/12 mm. D_4^{25} 1.0472.

Mono-benzyl ester: $\text{C}_{11}\text{H}_{10}\text{O}_4$. MW, 206. M.p. 98°.

Di-benzyl ester: $\text{C}_{18}\text{H}_{16}\text{O}_4$. MW, 296. M.p. 60–1°.

p-Nitrobenzyl ester : m.p. 151°.

Mono-phenyl ester : $C_{10}H_8O_4$. MW, 192. Needles. M.p. 130°. Sol. hot H_2O , EtOH, Et_2O . At 200° \rightarrow maleic anhydride + phenol.

Di-phenyl ester : $C_{16}H_{12}O_4$. MW, 268. Needles. M.p. 161–2°. B.p. 219°/14 mm. Spar. sol. EtOH.

Dibromide : $C_4H_2O_2Br_2$. MW, 242. B.p. 113–15°/32 mm.

Dichloride : $C_4H_2O_2Cl_2$. MW, 153. B.p. 158–60°. D_4^{20} 1.4117.

Diamide : $C_4H_6O_2N_2$. MW, 114. M.p. 267° decomp.

Di-nitrile : $C_4H_2N_2$. MW, 78. Needles. M.p. 96°. B.p. 186°.

Mono-Me ester monochloride : $C_5H_5O_3Cl$. MW, 148.5. M.p. 16°. B.p. 69.5°/14 mm.

Mono-Et ester monochloride : $C_6H_7O_3Cl$. MW, 162.5. B.p. 84°/17 mm.

Milas, *Organic Syntheses*, 1931, XI, 46.

Challenger, *Industrial Chemist*, 1930, 6, 390 (*Bibl., Review*).

Corson, Adams, Scott, *Organic Syntheses*, 1930, X, 48.

Anschütz, *Ann.*, 1928, 461, 155.

Wehmer, E.P., 146,411, (*Chem. Abstracts*, 1920, 14, 3749).

Fumarine.

See Protopine.

Fungisterol



$C_{25}H_{40}O$ MW, 356

Occurs, together with ergosterol, in ergot and other higher fungi. Leaflets from EtOH. M.p. 144–6° (152°). Sol. Et_2O . More easily sol. than ergosterol in usual solvents. $[\alpha]_D -20^\circ$ in $EtOH-CHCl_3$. 90% $H_2SO_4 \rightarrow$ ruby-red col.

Acetate : $C_{25}H_{39}O \cdot CO \cdot CH_3$. M.p. 158.5° (156–7°). $[\alpha]_D -16^\circ$ in $CHCl_3$.

Hart, Heyl, *J. Am. Chem. Soc.*, 1930, 52, 2014.

Zellner, Zikmunda, *Monatsh.*, 1930, 56, 200.

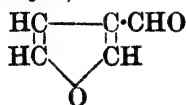
Furalacetone.

See Furfurylideneacetone.

α -Furaldehyde.

See Furfural.

β -Furaldehyde (3-Furaldehyde, 3-furyl aldehyde, 3-furoic aldehyde)



$C_5H_4O_2$

MW, 96

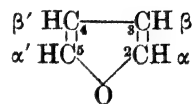
B.p. 144°/732 mm., 70–2°/43 mm. D_{20}^{20} 1.111. n_D^{20} 1.4945. Stable in the cold and in absence of light. Polymerises in direct sunlight. Gives no col. with aniline acetate test.

Diacetate : $C_4H_3O \cdot CH(O \cdot CO \cdot CH_3)_2$. M.p. 50°. B.p. 130°/15 mm.

Phenylhydrazone : m.p. 149.5°.

Gilman, Burtner, *J. Am. Chem. Soc.*, 1933, 55, 2908.

Furan (Furfuran)



C_4H_4O

MW, 68

B.p. 32°. D^0 0.9644. Easily sol. EtOH, Et_2O . Insol. H_2O . Heat of comb. C_p 500.1 Cal. Resinifies with min. acids. Unattacked by alkalis or Na. With pine-chip moistened with HCl \rightarrow emerald-green col.

Gilman, Louisinian, *Rec. trav. chim.*, 1933, 52, 156.

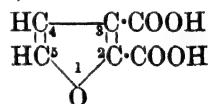
Hurd, Goldsby, Osborne, *J. Am. Chem. Soc.*, 1932, 54, 2532.

Wilson, U.S.P., 1,636,030, (*Chem. Abstracts*, 1927, 21, 2907).

Furan-carboxylic Acid.

See β -Furoic Acid and Pyromucic Acid.

Furan-2 : 3-dicarboxylic Acid (*Furan- $\alpha\beta$ -dicarboxylic acid*)



$C_6H_4O_5$

MW, 156

M.p. 221°. Does not form anhydride. Sublimes unchanged in vacuo.

Di-Me ester : $C_8H_6O_5$. MW, 184. M.p. 37° (39°).

Mono-anilide : m.p. 170°.

Asahina et al., *Chem. Abstracts*, 1927, 21, 2896.

Cf. Wessely, Dinjaski, *Monatsh.*, 1934, 64, 131.

Furan-2 : 4-dicarboxylic Acid (*Furan- $\alpha\beta'$ -dicarboxylic acid*).

Leaflets + $1H_2O$ from H_2O . M.p. 266°. Sublimes. Sol. hot H_2O , EtOH, Me_2CO . Spar. sol. cold H_2O , $CHCl_3$, CS_2 , AcOH. Pract. insol. Et_2O , ligroin.

4-Me ester : $C_7H_6O_5$. MW, 170. Plates from H_2O . M.p. 132.5°. *Chloride* : $C_7H_5O_4Cl$. MW, 188.5. M.p. 83–4°.

Di-Me ester: $C_8H_8O_5$. MW, 184. Prisms from MeOH. M.p. 109–10°.

Gilman, Burtner, *J. Am. Chem. Soc.*, 1933, 55, 403, 2903.

Furan-2 : 5-dicarboxylic Acid (*Dehydromucic acid, furan- $\alpha\alpha'$ -dicarboxylic acid*).

Needles from H_2O . M.p. above 320°. Sublimes. Isatin + conc. H_2SO_4 at 145–55° \rightarrow violet-blue sol.

Mono-Me ester: $C_7H_8O_5$. MW, 170. Leaflets from H_2O . M.p. 201–2°.

Di-Me ester: $C_8H_8O_5$. MW, 184. Needles from H_2O . M.p. 112°. B.p. 154–6°/15 mm.

Mono-Et ester: $C_8H_8O_5$. MW, 184. Needles from H_2O . M.p. 148–9°.

Di-Et ester: $C_{10}H_{12}O_5$. MW, 212. M.p. 47°. B.p. 167–8°/15 mm.

Dipropyl ester: $C_{12}H_{16}O_5$. MW, 240. M.p. 22°. B.p. 177°/15 mm.

Dichloride: $C_6H_2O_3Cl_2$. MW, 193. M.p. 80°. B.p. 245°.

Mono-amide: $C_6H_5O_4N$. MW, 155. M.p. 280–1°.

Diamide: $C_6H_6O_3N_2$. MW, 154. Needles from hot H_2O . M.p. above 240°.

Dianilide: long needles from 50% EtOH. M.p. 227–8°.

Phelps, Hale, *Am. Chem. J.*, 1901, 25, 445.

Yoder, Tollens, *Ber.*, 1901, 34, 3447.

Hill, *Ber.*, 1899, 32, 1221.

Furan-3 : 4-dicarboxylic Acid (*Furan- $\beta\beta'$ -dicarboxylic acid*).

M.p. 217–18°. Heat with quinoline \rightarrow β -furoic acid.

Di-Me ester: $C_8H_8O_5$. MW, 184. M.p. 46°.

Reichstein et al., *Helv. Chim. Acta*, 1933, 16, 280.

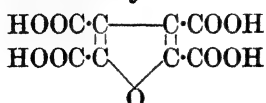
Furanethene.

See α -Furylethylene.

Furanethine.

See α -Furylacetylene.

Furan-tetracarboxylic Acid



$C_8H_4O_9$ MW, 244

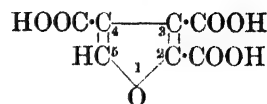
Cryst. from $Me_2CO-C_6H_6$. M.p. 247° decomp. Very sol. H_2O , Me_2CO , EtOH. Mod. sol. AcOH. Spar. sol. Et_2O , C_6H_6 . Insol. ligroin.

Tetra-Me ester: $C_{12}H_{12}O_9$. MW, 300. Needles from MeOH. M.p. 107–8°.

Tetra-Et ester: $C_{16}H_{20}O_9$. MW, 356. Cryst. from EtOH. M.p. 34–5°. B.p. 175°/0.2 mm.

Reichstein et al., *Helv. Chim. Acta*, 1933, 16, 280.

Furan-2 : 3 : 4-tricarboxylic Acid (*Furan- $\alpha\beta\beta'$ -tricarboxylic acid*)



$C_7H_4O_7$ MW, 200

Cryst. from AcOH. M.p. 273° decomp. Very sol. H_2O , EtOH. Spar. sol. Et_2O .

Tri-Me ester: $C_{10}H_{10}O_7$. MW, 242. M.p. 108°.

Tri-Et ester: $C_{13}H_{16}O_7$. MW, 284. M.p. 37°. B.p. 140°/0.3 mm.

See previous reference.

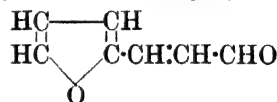
Furan-2 : 3 : 5-tricarboxylic Acid.

Cryst. from AcOH.

Tri-Me ester: $C_{10}H_{10}O_7$. MW, 242. B.p. 130–1°/0.3 mm.

Reichstein, Grüssner, *Helv. Chim. Acta*, 1933, 16, 555.

Furfuracrolein (*Furanacrolein, 2-furylacrolein, furfurylidene-acetaldehyde*)



$C_7H_6O_2$ MW, 122

Needles with cinnamon-like odour. M.p. 54°. B.p. over 200° part. decomp. Sol. EtOH, Et_2O , hot H_2O . Spar. sol. cold H_2O . Volatile in steam.

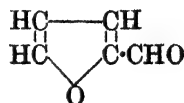
Semicarbazone: m.p. 215–19°.

Phenylhydrazone: cryst. from pet. ether. M.p. 132°.

Bray, Adams, *J. Am. Chem. Soc.*, 1927, 49, 2104.

König, *J. prakt. Chem.*, 1913, 88, 193.

Furfural (*2-Formylfuran, α -furaldehyde, furfuraldehyde, furfurol, 2-furylaldehyde, 2-furoic aldehyde*)



$C_5H_4O_2$ MW, 96

B.p. 162°, 90°/65 mm. D_4^{20} 1.1594. n_D^{20} 1.52608. Heat of comb. C_p 560 Cal. Sol. 11 parts H_2O .

at 13°. Very sol. EtOH, Et₂O. Darkens and resinifies on keeping. Volatile in steam. HNO₃ → oxalic acid. KMnO₄ or AgOH → pyromucic acid.

Diacetate: C₄H₃O·CH(O·CO·CH₃)₂. B.p. 143-4°/20 mm.

Oxime: *anti*-(α-): m.p. 75-6°. *Syn*-(β-): m.p. 91-2°.

Phenylhydrazone: leaflets. M.p. 97-8°.

p-Nitrophenylhydrazone: reddish-brown needles. M.p. 127°.

2:4-Dinitrophenylhydrazone: scarlet leaflets. M.p. 202°.

2:5-Dibromophenylhydrazone: m.p. 104°.

3:5-Dibromophenylhydrazone: m.p. 116°.

p-Tolylhydrazone: m.p. 105-6°.

2-Naphthylhydrazone: m.p. 134-5°.

Phenylsemicarbazone: m.p. 180-1°.

p-Tolylsemicarbazone: m.p. 156-7°.

Anil: see Furfurylideneaniline.

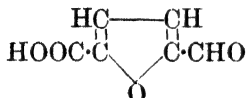
Hammer, *Chemistry and Industry*, 1933, 608.

Adams, Voorhees, *Organic Syntheses*, 1932, COLLECTIVE VOL. I, 274.

Gilman, Wright, *Rec. trav. chim.*, 1931, 50, 833.

Brady, Goldstein, *J. Chem. Soc.*, 1927, 1959.

Furfural-5-carboxylic Acid (*Aldehydopyromucic acid*)



C₆H₄O₄ MW, 140

Needles + 1H₂O from H₂O. M.p. anhyd. 202°. Sol. EtOH, hot H₂O. Spar. sol. Et₂O, CHCl₃, cold H₂O. Insol. C₆H₆, ligroin, CS₂. Alk. sol. + Ag₂O → furan-2:5-decarboxylic acid.

Oxime: m.p. 224-6° decomp.

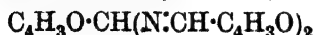
Phenylhydrazone: m.p. 176° decomp.

Hill, Sawyer, *Am. Chem. J.*, 1898, 20, 174.

Furfuraldehyde.

See Furfural.

Furfuramide (*Hydrofuramide*)



C₁₈H₁₂O₃N₂ MW, 268

Needles from EtOH. M.p. 117°. Sol. EtOH, Et₂O. Insol. cold H₂O. Heat of comb. C_p 1828 Cal. Decomp. by long boiling with H₂O, quickly by acids → NH₃ + furfural. Hot dil.

KOH → the isomeric base "furfurine," m.p. 116°.

Hartley, Dobbie, *J. Chem. Soc.*, 1898, 73, 599.

Furfuran.

See Furan.

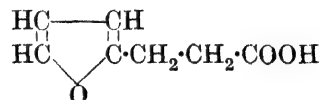
Furfurine.

See under Furfuramide.

Furfurol.

See Furfural.

Furfurylacetic Acid (2-[α-Furyl]-propionic acid)

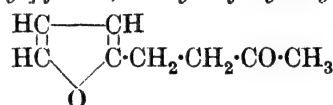


C₇H₈O₃ MW, 140

Cryst. from CHCl₃-ligroin. M.p. 58°.

Kirner, Richter, *J. Am. Chem. Soc.*, 1929, 51, 3133.

Furfurylacetone (1-[α-Furyl]-butanone-3, 2-[3-ketobutyl]-furan, methyl 2-furyl ethyl ketone)



C₈H₁₀O₂ MW, 138

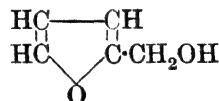
Oil with fruity odour. B.p. 203°, 101-2°/21-2 mm. D₄¹⁹ 1.0361. Forms cryst. comp. with NaHSO₃.

p-Bromophenylhydrazone: golden-yellow prisms from EtOH. M.p. 103-4°.

Semicarbazone: yellow leaflets. M.p. 143°.

See previous reference.

Furfuryl Alcohol (2-Furylcarbinol, 2-hydroxymethylfuran)



C₅H₆O₂ MW, 98

B.p. 170-1°, 75-7°/15 mm., 68-9°/10 mm. D₄²³ 1.1282. n_D²³ 1.48515. Heat of comb. C_p 612.8 Cal. (609). Misc. with H₂O in all proportions. Aq. sols. decompose on standing. Very sol. EtOH, Et₂O. Resinified by acids. Reduces cold KMnO₄, warm NH₃. AgNO₃. Poisonous.

Acetate: C₇H₈O₃. MW, 140. B.p. 175-7°. D₂₀ 1.1175.

Propionate: C₈H₁₀O₃. MW, 154. B.p. 195-6°. D₂₀ 1.1085.

Carbamate: C₄H₃O·CH₂O·CO·NH₂. Needles from ligroin. M.p. 50°.

Acid phthalate : m.p. 85°.

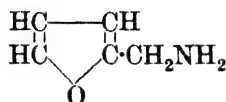
Wilson, *Organic Syntheses*, 1932, COLLECTIVE VOL. I, 270.

Zanetti, *J. Am. Chem. Soc.*, 1925, **47**, 535.

Furfurylaldehyde.

See α -Furylacetaldehyde.

Furfurylamine (α -Furylmethylamine, 2-aminomethylfuran)



C_5H_7ON

MW, 97

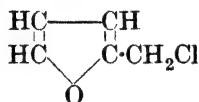
Colourless oil. B.p. 145–6°, 80°/84 mm. Misc. with H_2O . Absorbs CO_2 from the air \rightarrow cryst. comp., m.p. 75°.

Oxalate : $C_5H_7ON, C_2H_2O_4, \frac{1}{2}H_2O$. Leaflets from EtOH. Decomp. at 145°. Sol. H_2O .

Picrate : decomp. at 150°.

Zanetti, Beckmann, *J. Am. Chem. Soc.*, 1928, **50**, 2032.

α -Furfuryl chloride (*Furylmethyl chloride*, 2-chloromethylfuran)



C_5H_5OCl

MW, 116.5

B.p. 49°/26 mm., 37°/15 mm. D_4^{20} 1.1783. n_D^{20} 1.4941. Sol. ord. org. solvents. Insol. H_2O . Highly reactive. Readily resinifies in presence of moisture.

Reichstein, *Ber.*, 1930, **63**, 751.

Furfurylformic Acid.

See Furylacetic Acid.

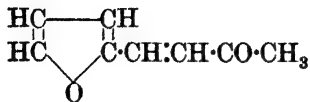
Furfurylidene-acetaldehyde.

See Furfuracrolein.

Furfurylideneacetic Acid.

See 2- α -Furylacrylic Acid.

Furfurylideneacetone (*Furfuralacetone*, 2-furalacetone, 2-[3-ketobutenyl]-furan, 1-furylbuten-3)



$C_8H_8O_2$

MW, 136

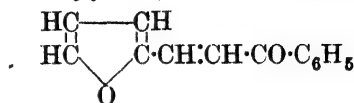
Needles. M.p. 39–40°. B.p. 135–7°/33–4 mm., 112–15°/10 mm. Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. pet. ether. Sol. conc. $H_2SO_4 \rightarrow$ yellow col. turning to dark wine-red on warming.

Phenylhydrazone : needles from EtOH. M.p. 131–2°.

Leuck, Cejka, *Organic Syntheses*, 1927, VII, 42.

Auwers, Voss, *Ber.*, 1909, **42**, 4426.

Furfurylideneacetophenone (*Phenyl furyl-vinyl ketone*, 1-benzoyl-2-furyl-ethylene, 2-phenacylidene-methylfuran)



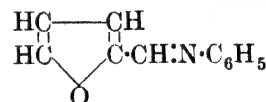
$C_{13}H_{10}O_2$

MW, 198

Oil. B.p. 317°, 181–2°/9 mm. D_4^{17} 1.150.

Semmler, Ascher, *Ber.*, 1909, **42**, 2356.

Furfurylideneaniline (α -Furfuralanil)



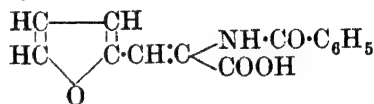
$C_{11}H_9ON$

MW, 171

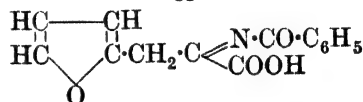
Cryst. M.p. 58°. B.p. 163–4°/19 mm.

de Chalmot, *Ann.*, 1892, **271**, 12.

Furfurylidenehippuric Acid (1-Benzoyl-amino-2- α -furylacrylic acid)



or



$C_{14}H_{11}O_4N$

MW, 257

Leaflets from EtOH.Aq. M.p. 210°.

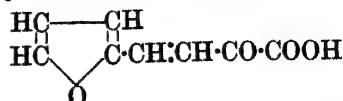
Me ester : $C_{15}H_{13}O_4N$. MW, 271. Leaflets. M.p. 141°.

Et ester : $C_{16}H_{15}O_4N$. MW, 285. Needles from dil. EtOH. M.p. 132–3°.

Amide : $C_{14}H_{13}O_3N_2$. MW, 256. Yellow needles from EtOH. M.p. 184°.

Posner, Sichert-Modrow, *Ber.*, 1930, **63**, 3082.

Furfurylidenepyruvic Acid



$C_8H_6O_4$

MW, 166

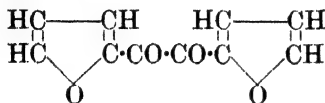
Yellow needles + $1\text{H}_2\text{O}$ from H_2O . M.p. anhyd. 112° . Sol. EtOH, Et₂O, Me₂CO, C₆H₆. Ox. \rightarrow furoylacrylic acid.

Et ester: C₁₀H₁₀O₄. MW, 194. Yellow needles from H₂O. M.p. $44-5^\circ$.

Phenylhydrazone: m.p. $164-5^\circ$.

Friedmann, *Helv. Chim. Acta*, 1931, **14**, 786.

α -Furil (Di- α -furoyl, di- α -furyl diketone, di-[α -furyl]-glyoxal)



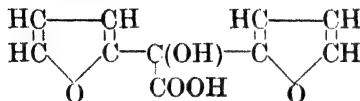
C₁₀H₆O₄ MW, 190

Yellow needles from C₆H₆. M.p. $165-6^\circ$. Sol. EtOH. Heat of comb. C_p 1064 Cal.

Hartman, Dickey, *J. Am. Chem. Soc.*, 1933, **55**, 1228.

Corson, McAllister, *J. Am. Chem. Soc.*, 1929, **51**, 2822.

Furilic Acid (α -Hydroxydi-[2-furyl]-acetic acid, difurylglycollic acid)



C₁₀H₈O₅ MW, 208

Fine needles. Decomp. at 100° . Very unstable in presence of H₂O. Sol. EtOH, Et₂O. Spar. sol. cold H₂O. Sol. conc. H₂SO₄ \rightarrow dark brown col.

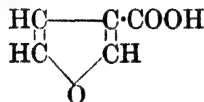
Fischer, *Ann.*, 1882, **211**, 222.

Evans, Dehn, *J. Am. Chem. Soc.*, 1930, **52**, 254.

α -Furoic Acid.

See Pyromucic Acid.

β -Furoic Acid (Furan-3-carboxylic acid)



C₅H₄O₃ MW, 112

Needles from H₂O. M.p. $122-3^\circ$. Spar. sol. H₂O. Aq. sol. gives no ppt. with FeCl₃.

Et ester: C₇H₈O₃. MW, 140. B.p. $65-7^\circ/14$ mm. D₂₀²⁰ 1.038. n_D²⁰ 1.4592.

Chloride: C₅H₃O₂Cl. MW, 130.5. M.p. 29° . B.p. $65^\circ/47$ mm.

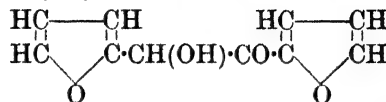
Amide: C₅H₅O₂N. MW, 111. M.p. 169° .

Gilman, Burtner, *J. Am. Chem. Soc.*, 1933, **55**, 2903.

Furoic Aldehyde.

See β -Furaldehyde and Furfural.

α -Furoin (Furylfuroylcarbinol, 1-hydroxy-2-keto-1:2-difurylethane)



C₁₀H₈O₄ MW, 192

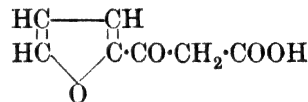
Needles from hot EtOH. M.p. $138-9^\circ$ (135°). Sol. MeOH. Heat of comb. C_p 1114 Cal.

Benzoate: m.p. $92-3^\circ$.

Hartman, Dickey, *J. Am. Chem. Soc.*, 1933, **55**, 1228.

Buck, Jenkins, *J. Am. Chem. Soc.*, 1929, **51**, 2163.

α -Furoylacetic Acid (Pyromucylacetic acid)



C₇H₆O₄ MW, 154

The free acid has not been isolated. The esters form cryst. Na, K and Cu salts and with FeCl₃ \rightarrow wine-red col.

Me ester: C₈H₈O₄. MW, 168. B.p. $144-5^\circ/20$ mm., $96-8^\circ/1$ mm. Oxime: m.p. $124-5^\circ$ decomp. Semicarbazone: m.p. $141-2^\circ$ decomp.

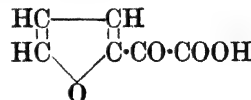
Et ester: C₉H₁₀O₄. MW, 182. B.p. $143-5^\circ/10$ mm. Oxime: m.p. $131-2^\circ$. Isonitroso-deriv.: needles. M.p. $128-9^\circ$.

Propyl ester: C₁₀H₁₂O₄. MW, 196. B.p. $110-12^\circ/1$ mm. Oxime: m.p. $120-1^\circ$. Semicarbazone: m.p. $137-8^\circ$.

Butyl ester: C₁₁H₁₄O₄. MW, 210. Needles. M.p. 25° . B.p. $136-8^\circ/3$ mm. Oxime: m.p. $101-2^\circ$. Semicarbazone: m.p. $127-8^\circ$.

Zanetti, Beckmann, *J. Am. Chem. Soc.*, 1928, **50**, 1438.

α -Furoylformic Acid (α -Furylglyoxylic acid, pyromucylformic acid)



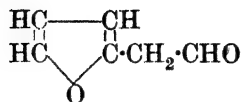
C₆H₄O₄ MW, 140

Colourless cryst. from ligroin. M.p. 98° . B.p. $105^\circ/1$ mm.

Chloride: C₆H₃O₃Cl. MW, 158.5. B.p. $65^\circ/1$ mm.

Anilide: leaflets from ligroin. M.p. $84-5^\circ$.

Reichstein, *Ber.*, 1930, **63**, 752.

α -Furylacetaldehyde (2-Furanacetaldehyde, *furfurylaldehyde*) $C_6H_6O_2$

MW, 110

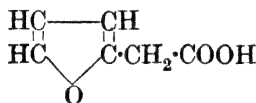
Colourless oil with strong hyacinth odour. B.p. $58^\circ/10$ mm. ($140-6^\circ/15$ mm.). Polymerises. Sensitive to atmospheric O, alkalis, acids, and heat.

Oxime: m.p. 63° . Gradually resinifies.

Semicarbazone: m.p. $131-2^\circ$.

Reichstein, *Ber.*, 1930, **63**, 753.

Scheibler, Tutundzitsch, *Ber.*, 1931, **64**, 2919.

 α -Furylacetic Acid (2-Furanacetic acid, α -*furfurylformic acid*) $C_6H_6O_3$

MW, 126

Leaflets from pet. ether. M.p. $68-9^\circ$. Sol. H_2O .

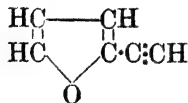
Chloride: $C_6H_5O_2Cl$. MW, 144.5. B.p. $65^\circ/1$ mm.

Nitrile: C_6H_5ON . MW, 107. B.p. $78-80^\circ/20$ mm., $69-73^\circ/10$ mm. D_4^{20} 1.0854. n_D^{20} 1.4715.

Anilide: leaflets from ligroin. M.p. $84-5^\circ$ ($79-80^\circ$).

Runde, Scott, Johnson, *J. Am. Chem. Soc.*, 1930, **52**, 1287.

See also first reference above.

 α -Furylacetylene (2-Furanethine, 2-acetylenylfuran) C_6H_4O

MW, 92

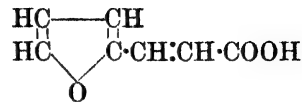
B.p. $105-6^\circ$, $54-5^\circ/120$ mm. D_4^{20} 0.9919. n_D^{20} 1.5055. Forms Ag and Cu derivs.

Hg deriv.: m.p. $118-19^\circ$.

Moureu, Dufraisse, Johnson, *Ann. chim.*, 1927, **7**, 28.

Furylacrolein.

See Furfuracrolein.

2- α -Furylacrylic Acid (*Furfurylideneacetic acid*) $C_7H_6O_3$

MW, 138

(i) *Stable form.*

Needles from H_2O . M.p. 141° . Sublimes in high vacuum at 112° . Sol. EtOH, Et₂O, AcOH, C_6H_6 . Mod. sol. hot H_2O . Spar. sol. cold H_2O . Insol. CS₂, ligroin. Heat of comb. C_p 757.3 Cal. $k = 3.25 \times 10^{-5}$ at 25° . Volatile in steam. Slow dist. $\rightarrow \alpha$ -furylethylene.

Me ester: $C_8H_8O_3$. MW, 152. M.p. 27.5° . B.p. $112^\circ/15$ mm.

Et ester: $C_9H_{10}O_3$. MW, 166. M.p. 24.5° . B.p. $230-3^\circ$, $120-1^\circ/17$ mm.

Amide: $C_7H_7O_2N$. MW, 137. M.p. $168-9^\circ$.

(ii) *Labile form.*

Prisms or plates. M.p. $103-4^\circ$. Sublimes in high vacuum at 95° . Sol. hot H_2O . Spar. sol. cold H_2O , C_6H_6 . Changes slowly, on boiling, into the stable form with part. decomp. $\rightarrow \alpha$ -furylethylene. In C_6H_6 sol. with I in sunlight \rightarrow stable form.

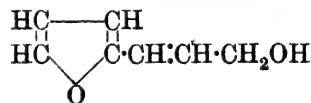
Gilman, Hewlett, *Chem. Abstracts*, 1930, **24**, 1640.

Posner, Sichert-Modrow, *Ber.*, 1930, **63**, 3084.

Liebermann, *Ber.*, 1894, **27**, 284.

Furyl Aldehyde.

See β -Furaldehyde and Furfural.

3- α -Furylallyl Alcohol (*Furfurylidene-ethylalcohol*, ω -hydroxypropenylfuran) $C_7H_8O_2$

MW, 124

B.p. $108-10^\circ/4$ mm. (slight decomp.). D_4^{20} 1.1439. n_D^{20} 1.5520. Unstable.

1-Naphthylurethane: rosettes from ligroin. M.p. 93.5° .

Bray, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2101.

Furylbutanone.

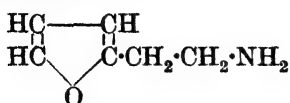
See Furfurylacetonone.

Furylbutenone.

See Furfurylideneacetone.

2-Furylcarbinol.

See Furfuryl Alcohol.

2- α -Furylethylamine (2- β -Aminoethylfuran) C_6H_9ON

MW, 111

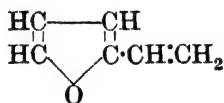
Pale yellow liq. B.p. 159°. Rapidly absorbs CO_2 .

N-Benzoyl: needles from EtOH.Aq. M.p. 81°.

Carbamate: m.p. 84°.

Picrolonate: m.p. 204° decomp.

Windaus, Dalmer, *Ber.*, 1920, **53**, 2306.

 α -Furylethylene (α -Furanethene, 2-vinylfuran) C_6H_6O

MW, 94

B.p. 99–100°, 49–50°/130 mm., 19°/17 mm.

D_4^{20} 0.9445. n_D^{20} 1.4992. Polymerises rapidly in presence of O and sunlight.

Moureu, Dufraisse, Johnson, *Ann. chim.*, 1927, **7**, 17.

Furylfuroylcarbinol.

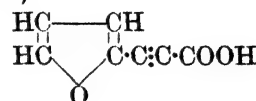
See $\alpha\alpha$ -Furoin.

Furylglyoxylic Acid.

See Furoylformic Acid.

Furylmethylamine.

See Furfurylamine.

 α -Furylpropionic Acid (2-Furanacetylene-carboxylic acid) $C_7H_4O_3$

MW, 136

Cryst. from pet. ether. M.p. 113–14° decomp.

Gilman, Hewlett, Wright, *J. Am. Chem. Soc.*, 1931, **53**, 4195.

Moureu, Dufraisse, Johnson, *Ann. chim.*, 1927, **7**, 40.

Furylpropionic Acid.

See Furfurylacetic Acid.

G

G-Acid.

See 2-Naphthol-6:8-disulphonic Acid.

Gadelaidic Acid.

See under Gadoleic Acid.

Gadoleic Acid $C_{19}H_{37}COOH$ $C_{20}H_{38}O_2$

MW, 310

Occurs in cod-liver and other oils.

Cis:

M.p. about 20°.

Amide: $C_{20}H_{39}ON$. MW, 309. M.p. 78–9°.

Trans: Gadelaidic Acid.

M.p. 53–4°.

Amide: m.p. 90–1°.

Bull, *Ber.*, 1906, **39**, 3574.

Vesely, Chudožilov, *Chem. Abstracts*, 1930, **24**, 2428.

Gaidic Acid (1-Pentadecylene-1-carboxylic

Dist. of Org. Comp.—II.

acid, 1-hexadecenoic acid, $\Delta^{1,2}$ -hexadecylenic acid, 2-tridecylacrylic acid)

 $CH_3[CH_2]_{12}CH:CHCOOH$ $C_{16}H_{30}O_2$

MW, 254

Cryst. M.p. 39°. Sol. EtOH.

Et ester: $C_{18}H_{34}O_2$. MW, 282. F.p. 9–10°.

Schröder, *Ann.*, 1867, **143**, 38.

Galactite.

See under Galactose.

Galactobiose (Galactosidogalactose) $C_{12}H_{22}O_{11}$

MW, 342

(1) Cryst. from MeOH. $[\alpha]_D^{20}$ +53.05° in H_2O . Osazone: m.p. 126–7°.

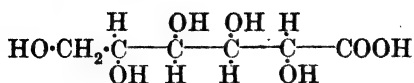
(2) Stereoisomer of (1). Cryst. from MeOH. Sinters at 78°, softens at 147.5°, m.p. 180°. $[\alpha]_D^{20}$ +35.01°. Osazone: m.p. 194°.

Bourquelot, *Ann. chim.*, 1920, **13**, 22.

Bourquelot, Aubry, *Compt. rend.*, 1917, **164**, 521; 1917, **165**, 60.

See also Fischer, Armstrong, *Ber.*, 1902, **35**, 3149.

Galactonic Acid

 $\text{C}_6\text{H}_{12}\text{O}_7$

MW, 196

d-.
 Needles from EtOH. M.p. 145–6° → lactone. $[\alpha]_D^{20} - 12.23^\circ$.

Et ester: *penta-acetyl*, cryst. from EtOH. M.p. 101–2°.

Amide: $\text{C}_6\text{H}_{13}\text{O}_6\text{N}$. MW, 195. M.p. 172–172.5°. $[\alpha]_D^{20} + 30.2^\circ$.

p-Bromophenylhydrazide: m.p. 125° decomp.

o-Tolylhydrazide: m.p. 191° decomp.

m-Tolylhydrazide: m.p. 174°.

p-Tolylhydrazide: m.p. 212°.

o-Toluidide: m.p. 204°.

m-Toluidide: m.p. 212°.

p-Toluidide: m.p. 224° decomp.

6-Acetyl deriv.: m.p. 160°.

6-Me ether: $\text{C}_7\text{H}_{14}\text{O}_7$. MW, 210. M.p. 156°.

γ-Lactone: $\text{C}_6\text{H}_{10}\text{O}_6$. MW, 178. Needles + H_2O . M.p. 66° (90–2°, 108–11° anhyd.). $[\alpha]_D^{20} - 65.5^\circ$ in H_2O . *Semicarbazone*: m.p. 189°.

dl-.
γ-Lactone: m.p. 122–5°.

Hudson, Komatsu, *J. Am. Chem. Soc.*, 1919, **41**, 1146.

Black, U.S.P., 1,864,229, (*Chem. Abstracts*, 1932, **26**, 4346).

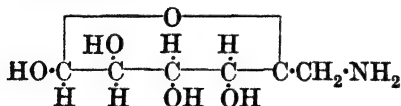
Levene, Meyer, *J. Biol. Chem.*, 1921, **46**, 307.

Hönig, Ruzicka, *Ber.*, 1929, **62**, 1434.

Brackenburg, Upson, *J. Am. Chem. Soc.*, 1933, **55**, 2512.

Killiani, *Ber.*, 1933, **66**, 119.

Galactosamine

 $\text{C}_6\text{H}_{13}\text{O}_6\text{N}$

MW, 179

N-Benzoyl: m.p. 132.5°. *Phenylhydrazine*: m.p. 201°.

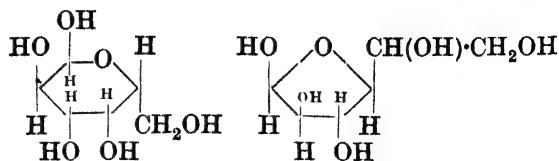
Perchlorate: m.p. 223° decomp.

Di-acetone deriv.: b.p. 122–6°/0.5–1.0 mm.

Hydrochloride: decomp. at 229°.

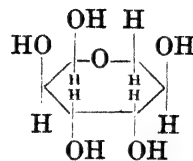
Freudenberg, Doser, *Ber.*, 1925, **58**, 298.

Galactose

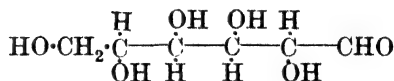


(I) Pyranose

(II) Furanose



(III) Septanose



(IV) Aldehyde

 $\text{C}_6\text{H}_{12}\text{O}_6$

MW, 180

d-. *Pyranose form*, (I).

Hydrolysis product of lactose, raffinose, stachyose, and galactan. Occurs as a component of pectins, gums and mucilages and of some flavone and anthocyanin glycosides, etc. Prisms or needles + H_2O from H_2O , m.p. 118–20°; plates from EtOH, m.p. 170°. $[\alpha]_D^{20} + 83.3^\circ$ in H_2O . *α-Form*: m.p. 168°. $[\alpha]_D^{20} + 144^\circ$ (initial) in H_2O . *β-Form*: $[\alpha]_D^{20} + 52^\circ$ (initial) in H_2O .

Osazone: yellow needles. M.p. 186°. $[\alpha]_D + 0.46^\circ$ in Py–EtOH.

Phenylhydrazine: needles from EtOH. M.p. 160–2°. $[\alpha]_D + 20.54^\circ$ in Py.

Methylgalactoside: $\text{C}_7\text{H}_{14}\text{O}_6$. MW, 194.

α-. Cryst. from AcOEt. M.p. 111–12°. $[\alpha]_D^{20} + 178.8^\circ$ in H_2O . Heat of comb. C_6 839.4 Cal.

β-. Cryst. from hot EtOH. M.p. 178–80°. $[\alpha]_D^{20} + 2.6^\circ$ in saturated borax sol. *Tetra-acetyl deriv.*: cryst. from EtOH. M.p. 93–4°. $[\alpha]_D - 25.5^\circ$ in C_6H_6 . *Tetra-Me ether*: m.p. 44–5°. B.p. 135–40°/11 mm. $[\alpha]_D^{20} + 30.7^\circ$ in H_2O .

Ethylgalactoside:

α-. Galactite. $\text{C}_8\text{H}_{16}\text{O}_6$. MW, 208. Occurs in lupins. Cryst. Sinters at 138°, m.p. 142° (140°). $[\alpha]_D + 185.52^\circ$ in H_2O .

β-. M.p. 153–5°. $[\alpha]_D^{20} - 4.0^\circ$ in H_2O . *Tetra-acetyl deriv.*: cryst. from EtOH. M.p. 88°. $[\alpha]_D^{20} - 29.8^\circ$ in C_6H_6 .

2:3:4:6-Tetra-Me ether: $\text{C}_{10}\text{H}_{20}\text{O}_6$. MW, 236. Cryst. from Et₂O. M.p. 71–2°. B.p. 172°/13 mm. $[\alpha]_D^{15} + 118^\circ$ in H_2O .

1 : 2 : 3 : 4 : 6-*Penta-acetyl deriv.* :

α -. Cryst. from EtOH. M.p. 96°. $[\alpha]_D^{20} + 107^\circ$ in CHCl_3 .

β -. Cryst. from EtOH. M.p. 142°. $[\alpha]_D^{20} + 23^\circ$ in CHCl_3 .

Oxime: m.p. 162–3°. *Hexa-acetyl deriv.*: (i) m.p. 146°. (ii) M.p. 106°.

Haworth, Hirst, Jones, *J. Chem. Soc.*, 1927, 2428 (*Bibl.*).

Deulofeu, Wolfrom, Cattaneo, Christman, Georges, *J. Am. Chem. Soc.*, 1933, 55, 3488.

Verschuur, *Rec. trav. chim.*, 1928, 47, 442 (*Bibl.*).

Herissey, Aubry, *Chem. Zentr.*, 1914, I, 1661.

Fischer, *Ber.*, 1914, 47, 456.

d-. *Furanose form*, (II).

Methylgalactoside: *tetra-Me ether*, b.p. 112°/0.015 mm. n_D 1.4405. $[\alpha]_D - 45.2^\circ$ in H_2O .

2 : 3 : 5 : 6-*Tetra-Me ether*: b.p. 136°/0.05 mm. n_D 1.4540. $[\alpha]_D - 21.2^\circ$ in H_2O .

Ethylgalactoside :

β -. M.p. 86°. $[\alpha]_D - 97.2^\circ$ in H_2O . *Tetra-acetyl deriv.*: m.p. 59°. $[\alpha]_D^{20} - 50.5^\circ$ in CHCl_3 .

1 : 2 : 3 : 5 : 6-*Penta-acetyl deriv.*: (α -. Cryst. from EtOH. M.p. 87°. $[\alpha]_D^{20} + 61^\circ$ in CHCl_3 . (β -. Cryst. from EtOH. M.p. 98°. $[\alpha]_D^{20} - 42^\circ$ in CHCl_3 .

Schlubach, Meisenheimer, *Ber.*, 1934, 67, 430.

d-. *Septanose form*, (III).

Methylgalactoside: α -. Syrup. $[\alpha]_D^{20} + 26^\circ$ in H_2O . *Tetra-Me ether*: b.p. 86°/0.005 mm.

1 : 2 : 3 : 4 : 5-*Penta-acetyl deriv.*: (α -. Cryst. from Et₂O. M.p. 128°. $[\alpha]_D^{20} - 11.0^\circ$ in CHCl_3 . (β -. Cryst. from Et₂O. M.p. 101°. $[\alpha]_D^{18} - 78.3^\circ$ in CHCl_3 .

Micheel, Suckfüll, *Ann.*, 1933, 507, 138.

d-. *Aldehyde form*, (IV).

Ethyl mercaptan: cryst. from hot H_2O . M.p. 140–2°. *Penta-acetyl deriv.*: needles from MeOH.Aq. M.p. 77.5–78.5°. $[\alpha]_D^{25} + 9.7^\circ$ in CHCl_3 .

Penta-acetyl deriv.: m.p. 121°. $[\alpha]_D^{25} - 25^\circ$ in CHCl_3 .

Wolfrom, *J. Am. Chem. Soc.*, 1930, 52, 2464.

l-.

M.p. 162–3°. $[\alpha]_D - 74^\circ$ in H_2O .

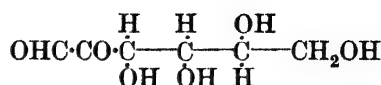
dl-.

M.p. 143–4°.

Fischer, Hertz, *Ber.*, 1892, 25, 1247.

Anderson, *J. Biol. Chem.*, 1933, 100, 249.

Galactosone



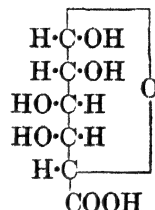
$\text{C}_6\text{H}_{10}\text{O}_8$

MW, 178

Tetra-acetyl deriv. of hydrate: m.p. 96°.

Maurer, Müller, *Ber.*, 1930, 63, 2070.

Galacturonic Acid



$\text{C}_6\text{H}_{10}\text{O}_7$

MW, 194

d-.

Decomposition product of pectin. Ox. \longrightarrow mucic acid.

Brucine salt: m.p. 180° decomp.

Cinchonine salt: m.p. 178° decomp.

Morphine salt: m.p. 162–3° decomp.

Phenylhydrazone: m.p. 140–1°.

p-*Bromophenylhydrazone*: m.p. 150–1°.

(α -. Needles + $1\frac{1}{2}\text{H}_2\text{O}$. Sinters at 110°. M.p. 156–9° decomp. $[\alpha]_D + 97.29^\circ$ (98.0°) in H_2O (initial).

Methylgalactoside: $\text{C}_7\text{H}_{12}\text{O}_7$. MW, 208. Cryst. + $2\text{H}_2\text{O}$ from H_2O . Sinters at 109°. M.p. 112–14° decomp. $[\alpha]_D^{20} + 129.9^\circ$ in H_2O . *Me ester*: $\text{C}_8\text{H}_{14}\text{O}_7$. MW, 222. Cryst. + $1\frac{1}{2}\text{H}_2\text{O}$ from MeOH.Aq. M.p. 140–1°. $[\alpha]_D^{20} + 125.0^\circ$ in H_2O .

(β -. M.p. 160° decomp. $[\alpha]_D^{20} + 27.0^\circ$ (initial).

Methylgalactoside: sinters at 126°. M.p. 134° decomp. $[\alpha]_D^{20} + 39.2^\circ$ in H_2O . *Me ester*: m.p. 193–4°. $[\alpha]_D^{20} - 45.6^\circ$ in H_2O .

dl-.

Needles from H_2O . M.p. 156° decomp.

Ehrlich, *Cellulose-Chemie*, 1930, 11, 149 (*Review*).

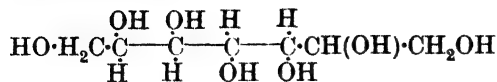
Niemann, Link, *J. Biol. Chem.*, 1932, 95, 203; 1934, 104, 743.

Morell, Link, *J. Biol. Chem.*, 1933, 100, 385.

Smolenski, Cichocki, *Chem. Abstracts*, 1933, 27, 1618.

Ehrlich, Guttman, *Biochem. Z.*, 1933, 259, 100; *Ber.*, 1933, 66, 220 (*Bibl.*).

d-Galaheptitol

C₇H₁₆O₇

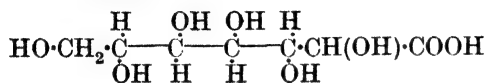
MW, 212

(α). l-α-Mannoheptitol. M.p. 187–8°. Sol. H₂O. Spar. sol. EtOH.

(β). Needles. Softens at 138°. M.p. 141–4°.

Peirce, *J. Biol. Chem.*, 1915, **23**, 327.

d-Galaheptonic Acid

C₇H₁₄O₈*

MW, 226

α-.

M.p. 206°. Sol. H₂O. Insol. EtOH.

Amide: m.p. 206°. [α]_D²⁰ + 14.5°. Hepta-acetyl deriv.: m.p. 125.5–126°.

Phenylhydrazide: m.p. 220°.

γ-Lactone: C₇H₁₂O₇. MW, 208. M.p. 145–7° (151°). [α]_D – 51°.

β-.

M.p. 145°.

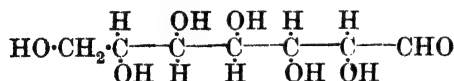
Phenylhydrazide: m.p. 185°.

Miksic, *Chem. Abstracts*, 1929, **23**, 2942.

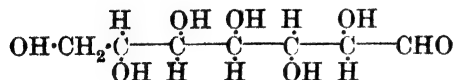
Killiani, *Ber.*, 1922, **55**, 96.

Hudson, Komatsu, *J. Am. Chem. Soc.*, 1919, **41**, 1141.

d-Galaheptose



α-.



β-.

C₇H₁₄O₇

MW, 210

α-.

Syrup. Sol. H₂O. Spar. sol. EtOH.

Osazone: m.p. 222°.

β-.

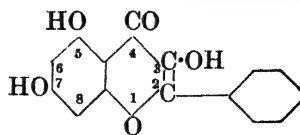
Cryst. from EtOH.Aq. Sublimes at 195–9° (rapid heat.) decomp.

Fischer, *Ann.*, 1895, **288**, 144.

Anderson, *J. Am. Chem. Soc.*, 1911, **33**, 1514.

Peirce, *J. Biol. Chem.*, 1915, **23**, 328.

Galangin (5 : 7-Dihydroxyflavonol)

C₁₅H₁₀O₅

MW, 270

Constituent of galanga root (*Alpinia officinarum*, Hance). Yellowish needles from EtOH. M.p. 214–15° (219–21°). Mod. sol. EtOH, Et₂O. Yellow sols. in aq. alkalis. Sublimes.

Triacetyl deriv.: m.p. 142.5–143.5°.

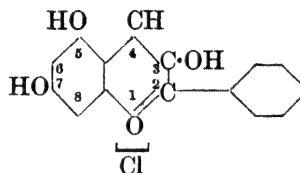
Tribenzoyl deriv.: m.p. 177°.

3-Me ether: C₁₆H₁₂O₅. MW, 284. Occurs with galangin. M.p. 299°. Diacetyl deriv.: m.p. 175–6°.

5 : 7-Di-Me ether: C₁₇H₁₄O₅. MW, 298. M.p. 177–8°. Acetyl deriv.: m.p. 192–3°.

Chavan, Robinson, *J. Chem. Soc.*, 1933, 368.

Galanginidin chloride (3 : 5 : 7-Trihydroxy-2-phenylbenzpyrilium chloride)

C₁₅H₁₁O₄Cl

MW, 290.5

Red prisms from EtOH. Darkens at 160°. M.p. above 300°. Sol. EtOH, CHCl₃. Sols. are red.

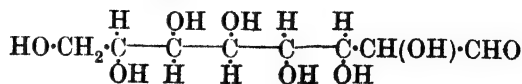
3-Me ether: C₁₆H₁₃O₄Cl. MW, 304.5. Brownish-red cryst. + 1H₂O. Red sol. in amyl alcohol, col. discharged by Na₂CO₃. Perchlorate: chars at 255–60°. M.p. above 300°.

Tri-Me ether: C₁₈H₁₇O₄Cl. MW, 332.5. Orange-red needles. Ferrichloride: yellowish-brown prisms. M.p. 174°. Sol. CHCl₃ to red sol.

Kondo, *Chem. Abstracts*, 1932, **26**, 4333.

Malkin, Robinson, *J. Chem. Soc.*, 1925, 1190.

d-Gala-octose

C₈H₁₆O₈

MW, 240

Leaflets + 1H₂O from hot EtOH.Aq. M.p. 109–11°. [α]_D – 40°.

Phenylhydrazone: plates from H_2O . M.p. 200–205°.

Osazone: m.p. 220–25° decomp.

Fischer, *Ann.*, 1895, **288**, 150.

Anderson, *J. Am. Chem. Soc.*, 1911, **33**, 1514.

Galegine (2-[2-Methyl- β -butenyl]-guanidine, 2-[isopropylidene-ethyl]-guanidine)



$\text{C}_8\text{H}_{13}\text{N}_2$ MW, 113

Alkaloid obtained from *Galega officinalis*, Linn. M.p. 60–5°. Hygroscopic. Insol. Et_2O , CHCl_3 , pet. ether.

Nitrate: m.p. 108°.

Sulphate: m.p. 227°.

Bicarbonate: m.p. 138°.

$\text{B}_2(\text{COOH})_2$: m.p. 192–5°.

N-Benzoyl: m.p. 95–6°.

N:N'-Di-m-nitrobenzoyl: m.p. 163–4°.

$\text{B}_2\text{H}_2\text{PtCl}_6$: m.p. 123°.

Picrate: m.p. 180–1°.

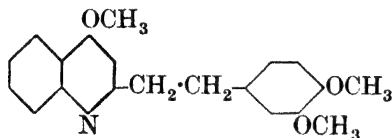
Späth, Spitzzy, *Ber.*, 1925, **58**, 2273.

Braun, *Chem. Abstracts*, 1932, **26**, 1391.

Galipidine.

See Galipine.

Galipine (Galipoline methyl ether, galipidine, 1-[4-methoxy-2-quinolyl]-2-[3:4-dimethoxyphenyl]-ethane, 4-methoxy-2-[3:4-dimethoxyphenylethyl]-quinoline)



$\text{C}_{20}\text{H}_{21}\text{O}_3\text{N}$ MW, 323

Occurs in bark of *Cusparia febrifuga*, Humb. (angostura bark). Cryst. from Et_2O . M.p. 113–5°.

B,HCl: m.p. 165°.

B,HI: m.p. 178°.

Picrate: m.p. 194°.

Späth, Papaioanou, *Monatsh.*, 1929, **52**, 134.

Galipoidine

$\text{C}_{19}\text{H}_{15}\text{O}_4\text{N}$ MW, 321

Occurs in bark of *Cusparia trifoliata*, Engler (angostura bark). M.p. 231°.

Tröger, Runne, *Chem. Abstracts*, 1911, **5**, 3044.

Späth, Pikel, *Monatsh.*, 1930, **55**, 352.

Galipol

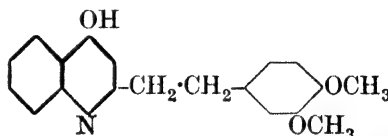
$\text{C}_{15}\text{H}_{26}\text{O}$

MW, 222

Constituent of angostura oil. Yellow oil. B.p. 264–5°. D^{20} 0.9270.

Beckurts, Tröger, *Chem. Zentr.*, 1898, **II**, 786.

Galipoline (4-Hydroxy-2-[3:4-dimethoxyphenylethyl]-quinoline, 1-[4-hydroxy-2-quinolyl]-2-[3:4-dimethoxyphenyl]-ethane)

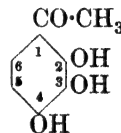


$\text{C}_{19}\text{H}_{19}\text{O}_3\text{N}$ MW, 309

Occurs in bark of angostura (*Cusparia febrifuga*, Humb.). Cryst. from Et_2O . M.p. 193°.

Späth, Papaioanou, *Monatsh.*, 1929, **52**, 129.

Gallacetophenone (2:3:4-Trihydroxyacetophenone, 4-acetopyrogallol, Alizarin Yellow C)



$\text{C}_8\text{H}_8\text{O}_4$ MW, 168

Needles or leaflets from H_2O . M.p. 173°. Sol. EtOH , hot H_2O . Spar. sol. C_6H_6 . $\text{FeCl}_3 \rightarrow$ brown col.

2-(or 4)-**Me ether**: $\text{C}_9\text{H}_{10}\text{O}_4$. MW, 182. M.p. 175°.

3-**Me ether**: m.p. 134–5°. 2:4-Diacetyl: m.p. 150–1°.

4-**Me ether**: 2:3-diacetyl, m.p. 146–8°.

2:3-Di-**Me ether**: oxime, m.p. 112°.

2:4-Di-**Me ether**: $\text{C}_{10}\text{H}_{12}\text{O}_4$. MW, 196. M.p. 79–80°. Phenylhydrazone: m.p. 108–10°.

3-Acetyl: m.p. 110–11°.

3:4-Di-**Me ether**: m.p. 83°.

Tri-**Me ether**: 2:3:4-trimethoxyacetophenone. $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210. M.p. 15–17°. B.p. 295–7°, 165°/12 mm.

3-(or 4)-**Et ether**: $\text{C}_{10}\text{H}_{12}\text{O}_4$. MW, 196. M.p. 102°.

2:4-Diacetyl: m.p. 107–8°.

Triacetyl: m.p. 85°.

Oxime: m.p. 162–3°.

Semicarbazone: m.p. 225° (rapid heat.).

Picrate: m.p. 133°.

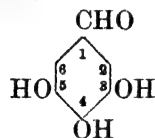
Perkin, Storey, *J. Chem. Soc.*, 1928, 232.

Perkin, *J. Chem. Soc.*, 1895, 67, 997.

Brand, Collischonn, *J. prakt. Chem.*, 1922, 103, 338.

Einhorn, Hollandt, *Ann.*, 1898, 301, 107.

Gallaldehyde (3 : 4 : 5-Trihydroxybenzaldehyde, gallic aldehyde)



$C_7H_6O_4$

MW, 154

Cryst. + $1H_2O$ from H_2O . M.p. 212° (rapid heat.) decomp. Sol. EtOH, C_6H_6 , $CHCl_3$, Me_2CO , hot H_2O . Spar. sol. Et_2O .

3-Me ether: $C_8H_8O_4$. MW, 168. Needles from C_6H_6 . M.p. 130–1°. Sol. EtOH, Et_2O . $FeCl_3$ → green col.

4-Me ether: m.p. 139–40°. **p-Nitrophenylhydrazone**: m.p. 222–3°.

3 : 5-Di-Me ether: see Syringa-aldehyde.

Tri-Me ether: 3 : 4 : 5-trimethoxybenzaldehyde. $C_{10}H_{12}O_4$. MW, 196. M.p. 78° (74–5°). B.p. 163–5°/10 mm. **p-Nitrophenylhydrazone**: m.p. 201–2°. **Oxime**: m.p. 83–4°. B.p. 198–200°/10 mm. **Semicarbazone**: m.p. 219–20°.

Triacetyl: m.p. 107–8°. **p-Nitrophenylhydrazone**: m.p. 207–8°.

Tricarbomethoxyl: m.p. 81–2°. **p-Nitrophenylhydrazone**: m.p. 206–7°.

Tribenzoyl: p-nitrophenylhydrazone, decomp. at 232–3°.

Oxime: decomp. at 195–200°. **Acetyl deriv.**: m.p. 126–7°.

p-Nitrophenylhydrazone: m.p. 226° (slow heat.), 234–6° decomp. (rapid heat.).

Cyanhydrin: decomp. at 150–60° (rapid heat.). **Tetra-acetyl deriv.**: m.p. 135°.

Rosenmund, Pfannkuch, *Ber.*, 1922, 55, 2357.

Rosenmund, Zetzsche, *Ber.*, 1918, 51, 594.
Nierenstein, *J. prakt. Chem.*, 1932, 132, 200, (*Bibl.*).

Gallatmide.

See under Gallic Acid.

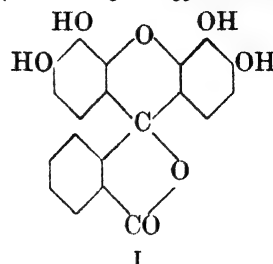
Gallanilide.

See under Gallic Acid.

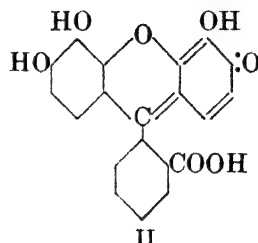
Gallanol.

See under Gallic Acid.

Gallein (4 : 5-Dihydroxyfluorescein)



I



II

$C_{20}H_{12}O_7$

MW, 364

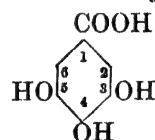
Brownish-red powder or fine cryst. with green, metallic lustre. Blackens above 180°. Sol. EtOH. Spar. sol. Et_2O , AcOH, Me_2CO . Insol. C_6H_6 , $CHCl_3$.

Me ester: (structure II). $C_{21}H_{14}O_7$. MW, 378. Amorphous. M.p. above 280°. **Tri-Me ether**: $C_{24}H_{20}O_7$. MW, 420. M.p. 199°.

Et ester tri-Et ether: (structure II). $C_{28}H_{28}O_7$. MW, 476. M.p. 155°.

Orndorff, Delbridge, *Am. Chem. J.*, 1909, 42, 185, (*Bibl.*).

Gallic Acid (3 : 4 : 5-Trihydroxybenzoic acid)



$C_7H_6O_5$

MW, 170

Occurs in many tannins. Cryst. + $1H_2O$ from H_2O . M.p. 253° decomp. (225° decomp., 235–40°). Sol. Me_2CO . Mod. sol. EtOH. Spar. sol. H_2O , Et_2O . Insol. C_6H_6 , $CHCl_3$. Heat of comb. C_p 634.1 Cal., C_v 634.7 Cal.

Me ester: gallicin. $C_8H_8O_5$. MW, 184. M.p. 157°. **Triacetyl**: m.p. 120–2° **Tribenzoyl**: m.p. 139°. **3 : 4-Diacetyl-5-benzoyl**: m.p. 110–11°. **3 : 5-Diacetyl-4-benzoyl**: m.p. 138–9°.

Et ester: $C_9H_{10}O_5$. MW, 198. M.p. 158°, anhyd. 160°. $k = 9 \times 10^{-8}$ at 25°. **Triacetyl**: m.p. 138°. **Tribenzoyl**: m.p. 126–8°.

Propyl ester: $C_{10}H_{12}O_5$. MW, 212. M.p. 150°.

Isopropyl ester: m.p. 123–124.5°.

Butyl ester: $C_{11}H_{14}O_5$. MW, 226. M.p. $143-4^\circ$ ($133-4^\circ$).

Isobutyl ester: m.p. $130-1^\circ$.

Amide: gallamide. $C_7H_7O_4N$. MW, 169. Leaflets $+1\frac{1}{2}H_2O$ from H_2O . M.p. anhyd. $244-5^\circ$. *N-Acetyl*: m.p. 210° . 3:4:5-*Triacetyl*: m.p. 163° .

Nitrile: gallonitrile, gallanol. $C_7H_5O_3N$. MW, 151. M.p. 223° . *Triacetyl*: m.p. $129-30^\circ$.

Anilide: gallanilide. $C_{13}H_{11}O_4N$. MW, 245. Leaflets $+2H_2O$ from $EtOH.Aq$. M.p. 207° (205°). *Triacetyl*: m.p. $161-2^\circ$. *Tribenzoyl*: m.p. 181° .

3-*Acetyl*: m.p. 225° decomp.

3:5-*Diacetyl*: m.p. $174-5^\circ$.

Triacetyl: m.p. $171-2^\circ$.

3-*Benzoyl*: m.p. $224-7^\circ$ ($240-2^\circ$).

3:5-*Dibenzoyl*: m.p. $218-21^\circ$.

Tribenzoyl: m.p. $191-2^\circ$.

3:4-*Diacetyl*-5-*benzoyl*: m.p. $178-9^\circ$.

3:5-*Diacetyl*-4-*benzoyl*: m.p. $183-4^\circ$.

3-*Me ether*: 4:5-dihydroxy-3-methoxybenzoic acid. $C_8H_8O_5$. MW, 184. M.p. 220° ($131-2^\circ$). *Me ester*: $C_9H_{10}O_5$. MW, 198. M.p. $112-13^\circ$. *Chloride*: $C_8H_7O_4Cl$. MW, 202.5. M.p. $101-2^\circ$. *Diacetyl*: m.p. $170-1^\circ$ ($102-3^\circ$).

4-*Me ether*: 3:5-dihydroxy-4-methoxybenzoic acid. M.p. 246° . *Diacetyl*: m.p. $120-1^\circ$. *Me ester*: m.p. 147° , *diacetyl*, m.p. $68-9^\circ$.

3:4-*Di-Me ether*: 3-hydroxy-4:5-dimethoxybenzoic acid. $C_9H_{10}O_5$. MW, 198. M.p. $197-8^\circ$. *Me ester*: $C_{10}H_{12}O_5$. MW, 212. M.p. 84° , 5-*benzoyl*, m.p. $91-2^\circ$.

3:5-*Di-Me ether*: see Syringic Acid.

Tri-Me ether: 3:4:5-trimethoxybenzoic acid. $C_{10}H_{12}O_6$. MW, 212. M.p. 166° . *Me ester*: $C_{11}H_{14}O_6$. MW, 226. M.p. 82.5° , b.p. $274-5^\circ$, $166-7^\circ/10$ mm. *Et ester*: $C_{12}H_{16}O_6$. MW, 240. M.p. $53-5^\circ$. *Phenylester*: $C_{16}H_{16}O_6$. MW, 288. M.p. 103° . *Chloride*: $C_{10}H_{11}O_4Cl$. MW, 230.5. M.p. $77-8^\circ$, b.p. $185^\circ/18$ mm. *Amide*: $C_{10}H_{13}O_4N$. MW, 211. M.p. $176-7^\circ$. *Nitrile*: $C_{10}H_{11}O_3N$. MW, 193. M.p. 95° , b.p. $180-5^\circ/10$ mm.

Tri-Et ether: 3:4:5-triethoxybenzoic acid. $C_{13}H_{18}O_6$. MW, 254. M.p. 112° . *Et ester*: $C_{15}H_{22}O_6$. MW, 282. M.p. 51° .

Glucoside: see Glucogallic Acid.

Schiff, *Ann.*, 1893, 272, 234.

Grehm, Gansser, *J. prakt. Chem.*, 1901, 63, 82.

Fischer, Nouri, *Ber.*, 1917, 50, 621.

Heffter, Capellmann, *Ber.*, 1905, 38, 3636.

Manning, Nierenstein, *Ber.*, 1912, 45, 1550.

Zimmermann, U.S.P., 1,222,345, (*Chem. Abstracts*, 1917, 11, 1886).

Christiansen, *J. Am. Chem. Soc.*, 1926, 48, 1360.

Mauthner, *Organic Syntheses*, 1926, VI, 96.

Yakimov, Tatarskaya, Russian Ps., 24,075, 28,280, (*Chem. Abstracts*, 1933, 27, 3851).

Hepner, Zyto, *Chem. Abstracts*, 1933, 27, 280.

Takino, *Chem. Abstracts*, 1929, 23, 2707.

Shriner, McCutchan, *J. Am. Chem. Soc.*, 1929, 51, 2193.

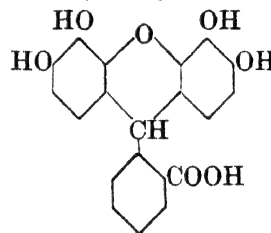
Gallic Aldehyde.

See Gallaldehyde.

Gallicin.

See under Gallic Acid.

Gallin (4:5-Dihydroxyfluorescin)



$C_{20}H_{14}O_7$

MW, 366

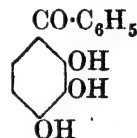
Needles from Et_2O . Sol. $EtOH$, $AcOH$, Me_2CO .

Tetra-Me ether Me ester: $C_{25}H_{24}O_7$. MW, 436. M.p. 127° .

Tetra-acetyl: m.p. 220° .

Orndorff, Delbridge, *Am. Chem. J.*, 1909, 42, 186.

Gallobenzophenone (4-*Benzoylpyrogallol*, 2:3:4-*trihydroxybenzophenone*, Alizarin Yellow A)



$C_{13}H_{10}O_4$

MW, 230

Yellow needles from $EtOH.Aq$. M.p. $140-1^\circ$ ($138-9^\circ$). Sol. $EtOH$, Et_2O , $AcOH$, Me_2CO , hot H_2O . Spar. sol. C_6H_6 .

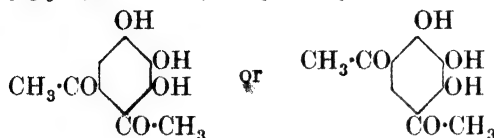
3-(or 4)-*Me ether*: $C_{14}H_{12}O_4$. MW, 244. M.p. 165° .

3:4-*Di-Me ether*: $C_{15}H_{14}O_4$. MW, 258. M.p. 131° ($120-1^\circ$). *Acetyl deriv.*: m.p. 98° .

Triacetyl: m.p. 117–18°. *Oxime*: m.p. 135°. *Phenylhydrazone*: m.p. 130°.

Fischer, Rapaport, *Ber.*, 1913, **46**, 2393.
Motylewski, *Ber.*, 1909, **42**, 3151.

Gallodiacetophenone (4:5-(or 4:6-)Di-acetylpyrogallol, trihydroxydiacetylbenzene)



C₁₀H₁₀O₅

MW, 210

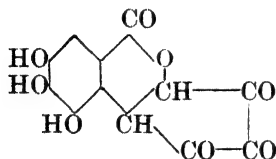
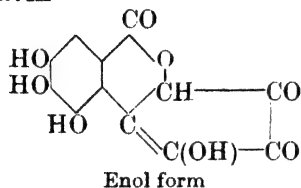
Yellow needles from H₂O. M.p. 190–1°.

Mono-acetyl deriv.: m.p. 207–9°.

Tribenzoyl: m.p. 189°.

Heller, *Ber.*, 1912, **45**, 2391.

Galloflavin



Keto form

C₁₂H₆O₈

MW, 278

Greenish-yellow leaflets. Blackens without melting. Sol. aniline. Spar. sol. H₂O, EtOH, Et₂O.

Tetra-Me ether: C₁₆H₁₄O₈. MW, 334. M.p. 236–9°.

Tetra-acetyl: m.p. 230–3°.

Herzig, *Ann.*, 1920, **421**, 247.

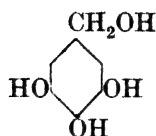
Gallonitrile.

See under Gallic Acid.

4-Galloylpyrogallol.

See 2:3:4:3':4':5'-Hexahydroxybenzophenone.

Gallyl Alcohol (3:4:5-Trihydroxybenzyl alcohol)



C₇H₈O₄

MW, 156

3:4:5-Tri-Me ether: 3:4:5-trimethoxybenzyl alcohol. C₁₀H₁₄O₄. MW, 198. B.p. 228°/25 mm.

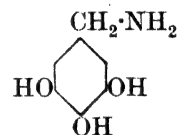
3:4:5-Tricarboethoxyl: m.p. 67–8°. Naphthylurethane: m.p. 131–2°. Ethyl-p-nitrobenzoate: m.p. 147–8°.

3:4:5-Tricarbethoxyl: m.p. 58–9°. Naphthylurethane: m.p. 87–8°.

Rosenmund, Pfannkuch, *Ber.*, 1922, **55**, 2369.

Rosenmund, Boehm, *Chem. Abstracts*, 1927, **21**, 2886.

Gallylamine (3:4:5-Trihydroxybenzylamine)



C₇H₉O₃N

MW, 155

B, HCl: m.p. 225–6° decomp. (rapid heat.). *Triacetyl deriv.*: m.p. 196–7°.

Tri-Me ether: 3:4:5-trimethoxybenzylamine. C₁₀H₁₅O₃N. MW, 197. Oil. Sol. H₂O, EtOH, Et₂O. *B₂H₂PtCl₆*: m.p. 197°.

Heffter, Capellmann, *Ber.*, 1905, **38**, 3639.
Rosenmund, Pfannkuch, *Ber.*, 1922, **55**, 2367.

d-Galtose

HO·CH₂·CH(OH)·CH(OH)·CO·CH(OH)·CH₂OH

C₆H₁₂O₆

MW, 180

Syrup. Mixture of α- and β-forms.

Osazone: m.p. 175–82°.

Nef, *Ann.*, 1914, **403**, 239, 347.

Gamma Acid.

See 2-Amino-8-naphthol-6-sulphonic Acid.

Gangaleoidin

C₁₈H₁₄O₇Cl₂

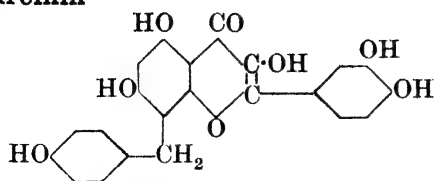
MW, 413

Depside present in *Lecanora gangaleoides*. Needles from EtOH-Me₂CO. M.p. 214–15°. Sol. Me₂CO, warm C₆H₆. Spar. sol. MeOH, EtOH, CHCl₃, Et₂O. No. col. with FeCl₃.

Acetyl deriv.: prisms from CHCl₃-EtOH. M.p. 244–5°.

Hardiman, Keane, Nolan, *Scientific Proceedings, Royal Dublin Society*, 1935, **21**, 141.

Garcinin



Suggested structure

$C_{22}H_{16}O_8 (+2H_2O)$ MW, 408 (444)

Occurs in bark of *Garcinia spicata*.

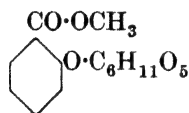
Penta-Me ether: $C_{27}H_{26}O_8, 1H_2O$. MW, 496.
Decomp. at $141-2^\circ$.

Murakami, *Chem. Zentr.*, 1934, II, 2394.

Gardenin.

See Crocetin.

Gaultherin (*Glucosido- β -methyl salicylate*)



$C_{14}H_{18}O_8$ MW, 314

Occurs in *Betula lenta*, Linn. Prisms from EtOH. M.p. $90-2^\circ$ (105° solvent-free). Sol. H_2O , EtOH, AcOH. Insol. Et_2O , $CHCl_3$, Me_2CO , C_6H_6 .

Tetra-acetyl deriv.: m.p. 154° .

Schneegens, Gerock, *Ber.*, 1894, 27R, 883.

Karrer, Weidmann, *Helv. Chim. Acta*, 1920, 3, 252.

Geijerene

$C_{12}H_{18}$ MW, 162

Oil present in *Geijera parviflora*. B.p. $85^\circ/17$ mm. $D_{20}^{20} 0.8720$. $n_D^{20} 1.4888$.

Hexahydro deriv.: b.p. $96^\circ/20$ mm. $D_{25}^{25} 0.8373$. $n_D^{25} 1.4577$.

Penfold, Simonsen, *Chem. Abstracts*, 1933, 27, 2684.

Geissospermine

$C_{40}H_{50}O_3N_4$ MW, 634

Alkaloid from bark of *Geissospermum velosii*, Allem. (Peruvian bark). (1) Cryst. $+2H_2O$. Sinters at 160° . M.p. $210-12^\circ$ decomp. Sol. MeOH, EtOH, C_6H_6 , AcOEt, Py. Spar. sol. H_2O , Et_2O , CCl_4 . $[\alpha]_D -108.2^\circ$ in EtOH. Zn dust dist. \rightarrow 2-methyl-4-ethylpyridine. (2) Cryst. $+1\frac{1}{2}H_2O$. Decomp. at $145-7^\circ$. $[\alpha]_D -101.9^\circ$ in EtOH.

Di-methiodide: $B_2, 2CH_3I, 4H_2O$. Decomp. at $261-2^\circ$.

$B_2(COOH)_2$: decomp. at 193° .

Bertho, Moog, *Ann.*, 1934, 509, 241, (Bibl.).

Gelsemicine.

Occurs in rhizome of *Gelsemium sempervirens*, Ait. Prisms from Me_2CO . M.p. 171° .

Chou, *Chem. Abstracts*, 1931, 25, 4085.

Gelsemine

$C_{20}H_{22}O_2N_2$ MW, 322

Occurs in rhizome of *Gelsemium sempervirens*, Ait. Cryst. from Me_2CO . M.p. 178° . $[\alpha]_D +15.9^\circ$ in $CHCl_3$.

B₂HCl: m.p. about 300° . $[\alpha]_D +2.6^\circ$ in H_2O .

Acetyl deriv.: m.p. $106-8^\circ$. *Hydrochloride*: m.p. 290° .

Benzoyl deriv.: *hydrochloride*, m.p. 303° .

See above reference and also

Sayre, *Chem. Abstracts*, 1919, 13, 2972.

Moore, *J. Chem. Soc.*, 1911, 99, 1231.

Gelseminic Acid.

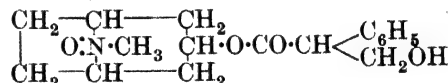
See Scopoletin.

Gemmatein

$C_{17}H_{12}O_7$ MW, 328

Pigment from *Lycoperdon gemmatum*, Batsch. Brown needles. Sol. EtOH. Spar. sol. H_2O . Insol. Et_2O . $H_2O_2 + HCl \rightarrow$ homogentisic anhydride. KOH fusion \rightarrow *p*-hydroxyphenylacetic acid.

Kotake, Naito, *Z. physiol. Chem.*, 1914, 90, 254.

Genatropine (*Atropine N-oxide*)

$C_{17}H_{23}O_4N$ MW, 305

M.p. $127-8^\circ$, decomp. at 135° .

Hydrochloride: m.p. $192-3^\circ$.

$(B_4SiO_2, 12WO_3, 2H_2O)nH_2O$: m.p. 187° .

Glucoside: $C_{23}H_{33}O_9N$. MW, 467. *d-Tartrate*: m.p. 111° . *Picrate*: m.p. $117-18^\circ$.

Polonowski, *Chem. Abstracts*, 1931, 25, 1289 (Review).

Polonowski, Polonowski, *Bull. soc. chim.*, 1926, 39, 1147.

Geneserethol (*Geneseroline ethyl ether*)

$C_{15}H_{22}O_2N_2$ MW, 262

Leaflets. M.p. 83° . $[\alpha]_D -182^\circ$ in EtOH.

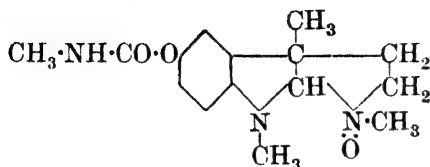
Hydrochloride: m.p. $120-4^\circ$.

Hydriodide: m.p. 108°.

Picrate: m.p. 156-7°.

Polonowski, Nitzberg, *Bull. soc. chim.*, 1915, 17, 249.

Geneserine (*Physostigmine oxide, eserine oxide*)



$C_{15}H_{21}O_3N_3$ MW, 291

Alkaloid of calabar bean. M.p. 128-9°.
[α]_D -175° in EtOH.

Salicylate: m.p. 89-90°.

Picrate: m.p. 175°.

Methiodide: m.p. 215°.

Polonowski, Nitzberg, *Bull. soc. chim.*, 1915, 17, 244; 1916, 19, 27.

Geneseroline

$C_{13}H_{18}O_2N_2$ MW, 234

Cryst. M.p. 150°. Sol. EtOH. Spar. sol. Et₂O, pet. ether. Oxidises rapidly in air.
[α]_D -176° in EtOH.

Hydrochloride: m.p. 154°.

Hydrobromide: m.p. 208°.

Picrate: m.p. 175°.

Et ether: see Geneserethol.

Polonowski, Nitzberg, *Bull. soc. chim.*, 1915, 17, 248.

ψ-Geneserolene.

See Hydroxyeserolene.

Genin

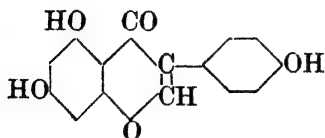
$C_{22}H_{32}O_6$ MW, 392

Occurs in digitalis species. M.p. 205-6°.

Dibenzoyl deriv.: sinters about 190°.

Killiani, *Ber.*, 1915, 48, 334.

Genistein (*Prunetol, 5:7:4'-trihydroxyiso-flavone*)



$C_{15}H_{10}O_5$ MW, 270

Occurs as the glucoside genistin in *Genista tinctoria*, Linn. (dyer's broom). Prisms from EtOH, Aq. M.p. 296-8° decomp.

(?)4'-*Me ether*: $C_{16}H_{12}O_5$. MW, 284. M.p. 189-91°.

(?)7-*Me ether*: prunetin. M.p. 242°.

5:4'-*Di-Me ether*: $C_{17}H_{14}O_5$. MW, 298. M.p. 290-3°.

7:4'-*Di-Me ether*: m.p. 140-2°. *Acetyl deriv.*: m.p. 202-4°.

Tri-Me ether: $C_{18}H_{16}O_5$. MW, 312. M.p. 162-3°.

7:4'-*Di-Et ether*: $C_{19}H_{18}O_5$. MW, 326. M.p. 132-4°. *Acetyl deriv.*: m.p. 168-70°.

Triacetyl deriv.: m.p. 200-2°.

Tribenzoyl deriv.: m.p. 239°.

Walz, *Ann.*, 1931, 489, 124.

Baker, Robinson, *J. Chem. Soc.*, 1928, 3115.

Genisteine

$C_{16}H_{28}N_2$ MW, 248

Alkaloid from broom. M.p. 60.5°. B.p. 177-8°/22 mm., 139.5-140.5°/5 mm.

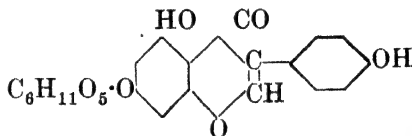
$B_2 \cdot 2HCl, 3AuCl_3$: m.p. 188°.

$B_2, H_2PtCl_6, \frac{1}{2}H_2O$: decomp. at 235°.

Dipicrate: m.p. 215° decomp.

Valeur, *Compt. rend.*, 1918, 167, 163.

Genistin (*Genistein glucoside*)



$C_{21}H_{20}O_{10}$ MW, 432

Glucoside of Soya bean and *Genista tinctoria*, Linn. Leaflets from EtOH. M.p. 254-6° decomp. [α]_D²¹ -27.7° in MeOH, Aq.

Tri-Me ether: $C_{24}H_{26}O_{10}$. MW, 474. M.p. 200-5° decomp.

Hexa-acetyl deriv.: m.p. 198°.

Hexa-benzoyl deriv.: m.p. 132°.

Walz, *Ann.*, 1931, 489, 121.

Gentiamarin

$C_{16}H_{22}O_{10}$ ($C_{16}H_{20}O_{10}$) MW, 374 (372)

Glucoside occurring in root of "enzian." Amorphous. Sol. H₂O, EtOH. [α]_D -80° to -90°. FeCl₃ → black col. Reduces Fehling's. Hyd. → glucose.

Tanret, *Bull. soc. chim.*, 1905, 33, 1071.

Gentianin.

See Gentisin.

Gentianose

$C_{18}H_{32}O_6$ MW, 344

Trisaccharide occurring in roots of various species of gentian. Cryst. from 95% EtOH.

M.p. 209°. Hyd. by gentianase \rightarrow sucrose + glucose; by invertase \rightarrow gentiobiose + fructose; by emulsin \rightarrow sucrose + glucose. $[\alpha]_D^{20} + 31.25^\circ$. Does not reduce Fehling's.

Sivadjian, *J. pharm. chim.*, 1929, 9, 434.

Bridel, *J. pharm. chim.*, 1930, 10, 62.

Gentienin

$C_{14}H_{10}O_5$ MW, 258

Occurs as glucoside gentiin in gentian. Yellow needles from EtOH. M.p. 225°.

Tanret, *Compt. rend.*, 1905, 141, 263.

Gentiin

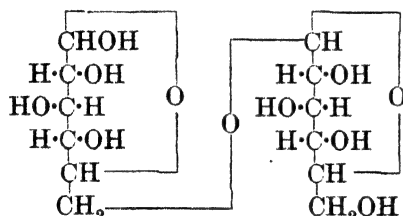
$C_{25}H_{28}O_{14}$ MW, 552

Glucoside from gentian root. Yellow needles from EtOH.Aq. M.p. 274°. Hyd. \rightarrow gentienin + glucose + xylose.

Tanret, *Compt. rend.*, 1905, 141, 263;

Bull. soc. chim., 1905, 33, 1073.

Gentiobiose (Isomaltose, 6- β -glucosidoglucose)



$C_{12}H_{22}O_{11}$ MW, 342

Disaccharide formed by hyd. of gentianose, α -crocin, and amygdalin.

α -Form :

Cryst. + 2CH₃OH from MeOH. M.p. 85.5-86°, anhyd. 189-195°. $[\alpha]_D^{20} + 31^\circ \rightarrow + 9.6^\circ$ in H₂O.

β -Form :

Cryst. from EtOH. M.p. 190-5°. $[\alpha]_D^{20} - 11^\circ \rightarrow + 9.6^\circ$ in H₂O.

Osozone : m.p. 162-7° decomp. $[\alpha]_D^{20} - 14.8^\circ$ in Py.

Methyl-glucoside : $C_{13}H_{24}O_{11}$. MW, 356. (α). Cryst. + 1EtOH. M.p. 102°. $[\alpha]_D^{20}$ (anhyd.) + 61.8° in H₂O. (β). M.p. 98°. $[\alpha]_D^{20} - 36.0^\circ$ in CHCl₃. **Hepta-acetyl :** m.p. 82°. $[\alpha]_D^{20} - 18.8^\circ$ in CHCl₃. **Hepta-Me ether :** m.p. 109° (106°). $[\alpha]_D^{16.5} - 20.89^\circ$ in EtOH.

Hepta-acetyl : m.p. 178°. $[\alpha]_D^{20} + 35.1^\circ \rightarrow + 31.6^\circ$ in Py. **Chloro :** (α). M.p. 136.5-137° (148°). $[\alpha]_D^{20} + 82.8^\circ$ (+ 80.57°) in CHCl₃. **Bromo :** (α). M.p. 144°. $[\alpha]_D^{20} + 101.08^\circ$ in CHCl₃.

Octa-acetyl : (α). M.p. 188-9°. $[\alpha]_D^{20} + 52.3^\circ$ in CHCl₃. (β). M.p. 192-3°. $[\alpha]_D^{20} - 5.3^\circ$ in CHCl₃.

Zemplén, Gerecs, *Ber.*, 1931, 64, 1545.

Hudson, Johnson, *J. Am. Chem. Soc.*, 1917, 39, 1272.

Brauns, *J. Am. Chem. Soc.*, 1927, 49, 3170.

Haworth, Wylam, *J. Chem. Soc.*, 1923, 123, 3120.

Taylor, Lipschitz, *J. Am. Chem. Soc.*, 1932, 54, 1054.

Gentiogenin

$C_{10}H_{10}O_4$ MW, 194

Occurs in gentian root as glucoside gentiopicrin. Needles. M.p. 185°. Sol. MeOH, hot EtOH.

Tetra-acetyl deriv. : m.p. 207-10°.

Tanret, *Bull. soc. chim.*, 1905, 33, 1059.

Gentiopicrin

$C_{16}H_{20}O_9$ ($C_{20}H_{30}O_{12}$) MW, 356 (462)

Glucoside from root of *Gentiana lutea*, Linn., and other species, and *Chlora perfoliata*, Linn. Cryst. from H₂O. M.p. 122°, anhyd. 191°. Spar. sol. EtOH. Insol. Et₂O. Reduces Tollen's reagent. $[\alpha]_D^{20} - 196.3^\circ$ in H₂O. Hyd. by emulsin \rightarrow gentiogenin + glucose.

Penta-acetyl deriv. : m.p. 139°. $[\alpha] - 164^\circ$.

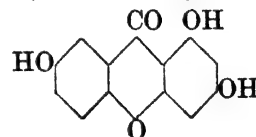
Kromayer, *Jahresbericht über die Fortschritte der Chemie*, 1862, 483.

Tanret, *Compt. rend.*, 1905, 141, 207;

Bull. soc. chim., 1905, 33, 1059.

Bridel, *J. pharm. chim.*, 1913, 6, 481; 1913, 7, 486; 1914, 10, 62.

Gentisein (2 : 4 : 7-Trihydroxyxanthone)



$C_{13}H_8O_5$ MW, 244

Orange-yellow needles from MeOH. M.p. 318°. Sol. EtOH.

2-Me ether : see Gentisin.

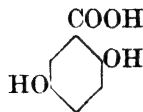
7-Me ether : isogentisin. $C_{14}H_{10}O_5$. MW, 258. M.p. 241°. **Acetyl deriv. :** m.p. 211-12°.

2 : 7-Di-Me ether : $C_{15}H_{12}O_5$. MW, 272. M.p. 167°. **Acetyl deriv. :** m.p. 189°.

2 : 4 : 7-Triacetyl : m.p. 226°.

Shinoda, *J. Chem. Soc.*, 1927, 1985.

Gentisic Acid (2:5-Dihydroxybenzoic acid, hydroquinonecarboxylic acid, 5-hydroxysalicylic acid)



$C_7H_6O_4$

MW, 154

Cryst. from H_2O . M.p. 200° . Sol. H_2O , EtOH, Et_2O . Insol. $CHCl_3$, C_6H_6 , CS_2 . $k = 1.3 (1.1) \times 10^{-3}$ at 25° . $FeCl_3 \rightarrow$ blue col. Reduces Fehling's and Tollen's reagent. Heat \rightarrow hydroquinone.

Me ester: $C_8H_8O_4$. MW, 168. M.p. 88° .

Diacetyl: m.p. $62-63.5^\circ$ in sealed tube.

Et ester: $C_9H_{10}O_4$. MW, 182. M.p. 77° .

Nitrile: $C_7H_5O_2N$. MW, 135. M.p. 151° .

2-Acetyl: m.p. $171-2^\circ$.

5-Acetyl: m.p. $131-2^\circ$.

Diacetyl: m.p. $118-19^\circ$.

2-Benzoyl: m.p. $211-12^\circ$.

5-Benzoyl: m.p. $178-9^\circ$.

2-Acetyl-5-benzoyl: m.p. $166-7^\circ$.

2-Me ether: 5-hydroxy-2-methoxybenzoic acid. $C_8H_8O_4$. MW, 168. M.p. $155-6^\circ$. *Me ester*, 5-benzoyl deriv., m.p. $83-4^\circ$.

5-Me ether: 5-methoxysalicylic acid. M.p. $145-6^\circ$. *Me ester*: $C_9H_{10}O_4$. MW, 182. B.p. 255° , $146-7^\circ/17$ mm.; *2-acetyl deriv.*, m.p. $45-6^\circ$, b.p. $183-4^\circ/16$ mm.; *2-benzoyl deriv.*, m.p. $106-7^\circ$.

Di-Me ether: see 2:5-Dimethoxybenzoic Acid.

5-Et ether: 2-hydroxy-5-ethoxybenzoic acid, 5-ethoxysalicylic acid. $C_9H_{10}O_4$. MW, 182. M.p. 164° .

5-Me-2-phenyl ether: 5-methoxy-2-phenoxybenzoic acid, 4-methoxydiphenyl ether 2-carboxylic acid. $C_{14}H_{12}O_4$. MW, 244. M.p. 156° .

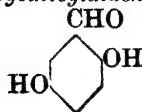
Fichter, Grisard, *Helv. Chim. Acta*, 1921, 4, 930.

Pukkedu, *Gazz. chim. ital.*, 1929, 59, 13.
Raistrick, Simonart, *Biochem. J.*, 1933, 27, 628.

Zeltner, Landau, D.R.P., 258,887, (*Chem. Zentr.*, 1913, I, 1641).

Mauthner, *J. prakt. Chem.*, 1915, 91, 180.

Gentisic Aldehyde (2:5-Dihydroxybenzaldehyde, 5-hydroxysalicylaldehyde)



$C_7H_6O_3$

MW, 138

Yellow needles from hot C_6H_6 . M.p. 99° .

Sol. H_2O , EtOH, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. ligroin.

5-Me ether: 2-hydroxy-5-methoxybenzaldehyde, 5-methoxysalicylaldehyde. $C_8H_8O_3$. MW, 152. M.p. 4° . B.p. $247-8^\circ$ (in CO_2). Sol. EtOH, Et_2O . *2-Acetyl*: m.p. 63° .

Di-Me ether: 2:5-dimethoxybenzaldehyde. $C_9H_{10}O_3$. MW, 166. Needles. M.p. 53° . Turns green on standing or on melting. B.p. 270° (in CO_2), $146^\circ/10$ mm. Sol. EtOH, Et_2O . *Semicarbazone*: m.p. 208° .

5-Et ether: 2-hydroxy-5-ethoxybenzaldehyde, 5-ethoxysalicylaldehyde. $C_9H_{10}O_3$. MW, 166. Yellow prisms. M.p. $51-2^\circ$. B.p. 230° . Sol. EtOH, Et_2O , $CHCl_3$. Volatile in steam. *2-Acetyl*: m.p. 69° .

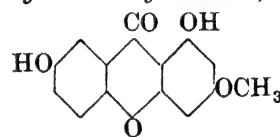
Di-Et ether: 2:5-diethoxybenzaldehyde. $C_{11}H_{14}O_3$. MW, 194. Colourless needles. M.p. 62.5° . B.p. $280-5^\circ$.

Semicarbazone: m.p. 249° .

Neubauer, Flatow, *Z. physiol. Chem.*, 1907, 52, 380.

Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).

Gentisin (Gentianin, gentisein 2-methyl ether, 4:7-dihydroxy-2-methoxyxanthone)



$C_{14}H_{10}O_5$

MW, 258

Yellow pigment from root of *Gentiana lutea*, Linn. Yellow needles. M.p. $266-7^\circ$.

Diacetyl: m.p. $196-196.5^\circ$.

Dibenzoyl: m.p. 192° .

Tunmann, *Chem. Zentr.*, 1916, II, 65.

Shinoda, *J. Chem. Soc.*, 1927, 1983 (*Bibl.*).

Binaghi, Falqui, *Chem. Abstracts*, 1926, 20, 645 (*Bibl.*).

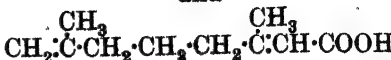
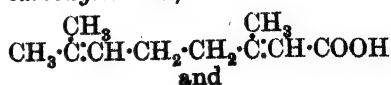
Geoffroyin.

See Surinamine.

Geranial.

See Citral.

Geranic Acid (2:6-Dimethyl-1:5-heptadiene-1-carboxylic acid and 2:6-dimethyl-1:6-heptadiene-1-carboxylic acid)



$C_{10}H_{16}O_2$

MW, 168

A mixture of the above isomers. B.p. 158°/14 mm., 153°/11 mm. $D_4^{19.4}$ 0.9518. $n_D^{20.2}$ 1.48695.

Me ester: $C_{11}H_{18}O_2$. MW, 182. B.p. 117°/14 mm. D_4^{20} 0.9220. $n_D^{19.1}$ 1.47143.

Et ester: $C_{12}H_{20}O_2$. MW, 196. B.p. 110–20°.

Nitrile: $C_{10}H_{15}N$. MW, 149. B.p. 138–40°/15 mm., 110°/10 mm. D^{20} 0.8709. n_D^{20} 1.4759.

Tiemann, *Ber.*, 1898, 31, 827.

Verley, *Bull. soc. chim.*, 1919, 25, 70.

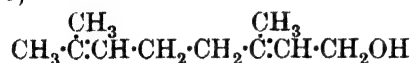
Geraniene

$C_{10}H_{16}$ MW, 136

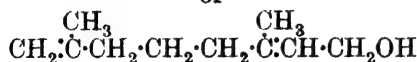
B.p. 162–4°. D^{20} 0.8425.

Jacobsen, *Ann.*, 1871, 157, 239.

Geraniol (2 : 6-Dimethyl-2 : 6(or 2 : 7)-octadienol-8)



or



$C_{10}H_{18}O$ MW, 154

Occurs in oils of *Andropogon schoenanthus*, Linn., *Pelargonium odoratissimum*, Ait., rose, palmarosa, etc. Liq. at -15° . B.p. 230°, 129°/25 mm., 122°/29 mm., 121°/18 mm., 120.5–122.5°/17 mm., 110.5–111°/10 mm., 107–107.6°/8 mm., 94°/3 mm. D^{20} 0.8894. n_D^{20} 1.4766. Sol. EtOH, Et₂O. Insol. H₂O.

Et ether: $C_{12}H_{22}O$. MW, 182. B.p. 218°, 115°/19 mm. D^{25} 0.864.

Formyl: geranyl formate. B.p. 113–14°/15 mm., 104–5°/10–11 mm.

Acetyl: geranyl acetate. Occurs in citronella, orange flower and other volatile oils. B.p. 242–5°/764 mm. decomp., 130–2°/22 mm., 127.8–129.2°/16 mm., 129–130.5°/14.5 mm., 110–15°/10–11 mm. D^{25} 0.9174. n_D^{15} 1.4628.

Butyryl: geranyl butyrate. B.p. 151–3°/18 mm., 142–3°/13 mm. D_4^{17} 0.9008.

Isobutyryl: geranyl isobutyrate. B.p. 135–7°/13 mm.

Benzoyl deriv.: geranyl benzoate. B.p. 198–200°/15 mm., 194–5°/12 mm.

Diphenylurethane: m.p. 82°.

Valli-Douau, *Revue de Parfumerie*, 1925, 5, 10 (Review).

Kötz, Steche, *J. prakt. Chem.*, 1924, 107, 193.

Labo, *Chimie et Industrie*, 1923, 10, 931.

Forster, Cardwell, *J. Chem. Soc.*, 1913, 103, 1342.

Sachs, *Perfumer's Journal*, 1926, 7, iii, 11, 32; iv, 11.

Dubosc, *Parfumerie moderne*, 1925, 18, 98, 196.

Verley, *Bull. soc. chim.*, 1919, 25, 73.

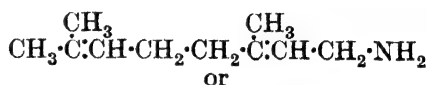
Geraniolene.

See 2 : 6-Dimethylheptadiene-1 : 5.

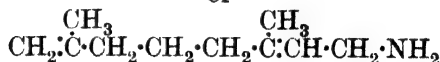
Geranyl acetate.

See under Geraniol.

Geranylamine (3 : 7-Dimethyl-2 : 6(or 2 : 7)-octadienylamine, 1-amino-3 : 7-dimethyloctadiene-2 : 6(or 2 : 7))



or



$C_{10}H_{19}N$ MW, 153

Probably a mixture of above isomers. B.p. 105°/19 mm. D^{25} 0.829.

B, HCl: m.p. about 120°.

N-Acetyl: b.p. 191°/18 mm.

N-Benzylidene: b.p. 220°/20 mm.

Picrate: m.p. 117–19°.

Forster, Cardwell, *J. Chem. Soc.*, 1913, 103, 1343.

Geranyl benzoate.

See under Geraniol.

Geranyl butyrate.

See under Geraniol.

Geranyl formate.

See under Geraniol.

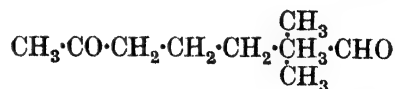
Geranyl isobutyrate.

See under Geraniol.

Germanin.

See Bayer 205. Addendum, Vol. I., p. 693.

Geronaldehyde (1 : 1-Dimethyl-4-aceto-n-valeraldehyde, geronic aldehyde)

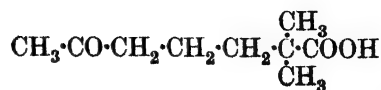


$C_9H_{16}O_2$ MW, 156

B.p. 48–50°/3 mm.

Pummerer, Rebmann, Reindel, *Ber.*, 1931, 64, 497.

Geronic Acid (1 : 1-Dimethyl-4-aceto-n-valeric acid)



$C_9H_{16}O_3$ MW, 172

B.p. 275–80°/740 mm., 190–1°/31 mm., 169°/12 mm., 132°/2 mm. Sol. EtOH, Et₂O. D_{20}^{20} 1.0211. n_D^{20} 1.44883. $\text{HNO}_3 \rightarrow$ 1:1-dimethylglutaric acid.

Et ester: $\text{C}_{11}\text{H}_{20}\text{O}_3$. MW, 200. B.p. 121–2°/12 mm.

Oxime: m.p. 93–4°.

Semicarbazone: m.p. 164°.

2:4-Dinitrophenylhydrazone: m.p. 135.5–137°.

Masson, *Compt. rend.*, 1912, **154**, 518.

Pummerer, Rebmann, Reindel, *Ber.*, 1931, **64**, 494.

Strain, *J. Biol. Chem.*, 1933, **102**, 137.

Geronic Aldehyde.

See Geronaldehyde.

Gheddic Acid

$\text{C}_{34}\text{H}_{68}\text{O}_2$ MW, 508

Constituent of Ghedda or East Indian Wax from *Apis dorsata*, *A. florea* and *A. indica*. Needles from AcOEt. M.p. 94.5–95°. Spar. sol. Et₂O.

Lipp, Casimir, *J. prakt. Chem.*, 1919, **99**, 263.

Gingerol

$\text{C}_6\text{H}_3(\text{OH})(\text{OCH}_3) \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CO} \cdot \text{CH}_2 \cdot \text{CH}(\text{OH}) \cdot \text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2$

$\text{C}_{17}\text{H}_{26}\text{O}_4$ MW, 294

Occurs in rhizome of *Zingiber officinale*, Rosc. Not obtained pure. B.p. 235–40°/18 mm., 227–9°/6 mm. Sol. EtOH, Et₂O, CHCl_3 , C_6H_6 . Mod. sol. hot pet. ether. D_{20}^{20} 1.0713. n_D^{20} 1.5212. $[\alpha]_D^{20} +12.9^\circ$.

Me ether: $\text{C}_{16}\text{H}_{28}\text{O}_4$. MW, 308. M.p. 63.5–64°. $[\alpha]_D^{20} +9.04^\circ$ in EtOH. Oxime: m.p. 85.5–86.5°.

Nomura, Iwamoto, *Science Reports Tokyo Imperial University*, 1928, **17**, 973; 1929, **18**, 661.

Redgrove, *Pharm. J.*, 1930, **125**, 54 (*Bibl., Review*).

Lapworth, Pearson, Royle, *J. Chem. Soc.*, 1917, **111**, 777.

Ginkgol (m-Hydroxypentadecenylbenzene, 15-m-hydroxyphenylpentadecylene-7)

$\text{CH}_2 \cdot [\text{CH}_2]_6 \cdot \text{CH} \cdot \text{CH} \cdot [\text{CH}_2]_5 \cdot \text{CH}_3$



$\text{C}_{21}\text{H}_{34}\text{O}$ MW, 302

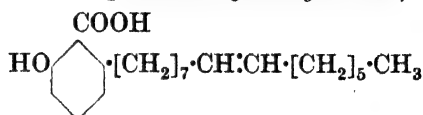
B.p. 221–3°/4 mm. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ orange-red sol.

Me ether: $\text{C}_{22}\text{H}_{36}\text{O}$. MW, 316. B.p. 224–8°/7 mm.

Kawamura, *Japan J. Chem.*, 1928, **3**, 89.

Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, **24**, 304.

Ginkgolic Acid (6-Hydroxy-2-pentadecenylbenzoic acid, 6-pentadecenylsalicylic acid)



$\text{C}_{22}\text{H}_{34}\text{O}_3$ MW, 346

Constituent of *Ginkgo biloba*, Linn. Needles from pet. ether. M.p. 42–3°. Alc. $\text{FeCl}_3 \rightarrow$ violet col. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ yellow sol. with green fluor. Heat \rightarrow ginkgol + CO_2 .

Me ether: $\text{C}_{23}\text{H}_{36}\text{O}_3$. MW, 360. Me ester: $\text{C}_{24}\text{H}_{38}\text{O}_3$. MW, 374. B.p. 230–3°/2 mm. No col. with alc. FeCl_3 .

Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1935, **26**, 178.

See also first reference above.

Ginnol

$\text{C}_{27}\text{H}_{56}\text{O}$ MW, 396

Constituent of *Ginkgo biloba*, Linn. Cryst. from EtOH or Me_2CO . M.p. 82.5°. Sol. Et₂O, C_6H_6 , CHCl_3 , pet. ether. Spar. sol. EtOH, MeOH.

Acetyl deriv.: plates from Me_2CO . M.p. 43–45°.

Kawamura, *Japan J. Chem.*, 1928, **3**, 100.

Ginnone

$\text{C}_{27}\text{H}_{54}\text{O}$ MW, 394

Cryst. from EtOH.Aq. M.p. 74–5°.

Oxime: needles from EtOH. M.p. 49–50°.

Semicarbazone: cryst. from EtOH.Aq. M.p. 45–6°.

Kawamura, *Japan J. Chem.*, 1928, **3**, 101.

Gitaligenin

$\text{C}_{11}\text{H}_{18}\text{O}_3$ MW, 198

Hydrolysis product of gitalin. Needles. M.p. 222°.

Cloetta, *Chem. Abstracts*, 1926, **20**, 2724.

Gitalin (ψ -Digitonin)

$\text{C}_{17}\text{H}_{28}\text{O}_6$ MW, 328

Glucoside obtained from *Digitalis purpurea*, Linn. (foxglove). M.p. 245°. Sol. EtOH, CHCl₃, Me₂CO. $[\alpha]_D^{25} -25.2^\circ$ in CHCl₃.

Steppun, *Chem. Abstracts*, 1929, **23**, 1213.

Windaus, *Chem. Abstracts*, 1930, **24**, 4789.

Maneli, *Gior. chim. ind. applicata*, 1922, **4**, 355.

See also above reference.

Githagenin

C₂₉H₄₄O₄ MW, 456

Occurs in *Lychnis Githago*, Scop., (corn cockle seed). M.p. 286–7° decomp. $[\alpha]_D +77.3^\circ$.

Diacetyl deriv.: m.p. 187–8°.

Oxime: m.p. 155–7° decomp.

Semicarbazone: m.p. 292° decomp.

Wedekind, Schicke, *Z. physiol. Chem.*, 1929, **182**, 72; 1930, **190**, 1.

Githagic Acid

C₂₉H₄₂O₆ MW, 486

M.p. 223–4°.

Dioxime: m.p. 225° decomp.

See previous reference.

Githagoic Acid

C₂₈H₄₄O₅ MW, 460

M.p. 359°. $[\alpha]_D +91.6^\circ$.

Di-Me ester: C₃₀H₄₈O₅. MW, 488. M.p. 247°. $[\alpha]_D +77^\circ$.

Wedekind, Schicke, *Z. physiol. Chem.*, 1930, **190**, 1.

Githagonolic Acid

C₂₅H₃₈O₄ MW, 402

Cryst. +1H₂O. M.p. 364°.

Me ester: C₂₆H₄₀O₄. MW, 416. M.p. 234–5°.

Mono-acetyl deriv.: m.p. 171°.

Mono-acetyl deriv.: m.p. 321°.

See previous reference.

Gitin

C₅₅H₉₄O₂₈ MW, 1202

Glucoside from digitalis leaves. M.p. 265°. Hyd. → galactose + digitogenin.

Kraft, *Chem. Zentr.*, 1912, **I**, 1576.

Kobert, *ibid.*, **II**, 947.

Gitogenic Acid

C₂₆H₄₀O₆ MW, 448

Leaflets. M.p. 242–3°.

Windaus, Linsert, *Z. physiol. Chem.*, 1925, **147**, 275.

Gitogenin (Digine)

C₂₆H₄₂O₄ MW, 418

Leaflets. M.p. 271–2°. Se → γ-methyl-cyclopentenylphenanthrene.

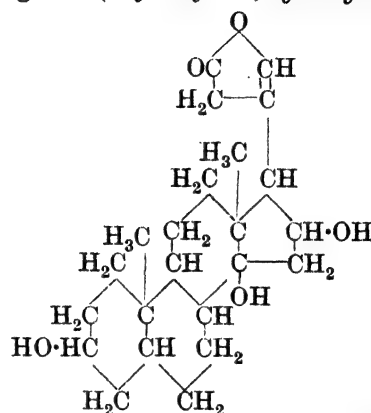
Diacetyl deriv.: m.p. 243–4°.

Dipropionyl deriv.: m.p. 195–6°.

Jacobs, Simpson, *J. Am. Chem. Soc.*, 1934, **56**, 1424; *J. Biol. Chem.*, 1935, **110**, 429.

See also previous reference.

Gitoxigenin (Bigitaligenin, hydroxydigitoxin)



C₂₃H₃₄O₅ MW, 390

Leaflets from MeOH. M.p. 231–2° (224–5° decomp.).

Diacetyl deriv.: m.p. 249–50°.

Dibenzoyl deriv.: m.p. 262°.

Jacobs, Elderfield, *J. Biol. Chem.*, 1935, **108**, 497.

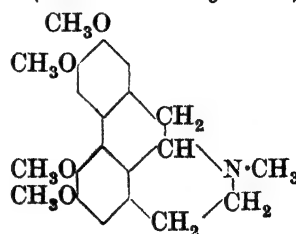
Gitoxin (Anhydrogitalin, bigitalin)

C₄₁H₆₄O₁₄ MW, 780

Glucoside from digitalis leaves. M.p. 266–9° (varies with rate of heating). Spar. sol. H₂O, EtOH, CHCl₃. Hyd. → gitoxigenin + 3 mols. digitoxose.

Windaus, Westphal, Stein, *Ber.*, 1928, **61**, 1847.

Glaucine (Boldine dimethyl ether)



C₂₁H₂₅O₄N

MW, 355

Glucoacetovanillone.

See Androsin.

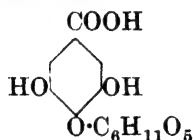
Glucofrangulin (Frangulin glucoside)

C₂₇H₃₀O₁₄ MW, 578

Occurs in frangula bark. Amorphous yellow solid + 1H₂O. M.p. 215°. Sol. H₂O, MeOH, EtOH, AcOH, Py. Insol. C₆H₆, CHCl₃, CS₂, Et₂O. H₂SO₄.Aq. → frangula-emodin + glucose + rhamnose.

Casparis, Maeder, *Bull. soc. chim. biol.*, 1927, 9, 324; *Chem. Abstracts*, 1927, 21, 2169.

Glucogallic Acid (β-4-Glucosido-3:4:5-trihydroxybenzoic acid, gallic acid glucoside)



C₁₃H₁₆O₁₀ MW, 332

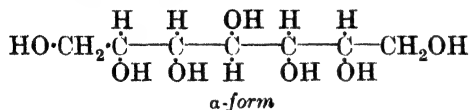
Occurs in galls. Grey prisms from Me₂CO. M.p. 233°. Sol. H₂O, EtOH. Reduces Fehling's.

Et ester: tetra-acetyl deriv., m.p. 180–1°. [α]_D²⁰ – 10.66° in C₂H₂Cl₄. *Hexa-acetyl deriv.*, m.p. 176–7°. [α]_D¹⁸ – 19° in C₂H₂Cl₄.

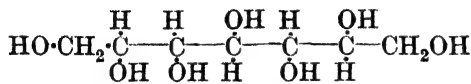
Me ether: C₁₄H₁₈O₁₀. MW, 346. M.p. 79°.

Fischer, *Ber.*, 1919, 52, 820 (*Bibl.*).

Glucoheptitol (Glucoheptite)



α-form



β-form

C₇H₁₆O₇ MW, 212

α-Form:

Prisms from MeOH. M.p. 134–5°. Sol. H₂O. Spar. sol. EtOH. Heat of comb. 841.2 Cal. Optically inactive.

Hepta-acetyl: plates from H₂O. M.p. 113°.

β-Form:

Plates from EtOH. M.p. 130–1°. Sol. H₂O. Spar. sol. EtOH. [α]_D¹⁹ + 0.48° in H₂O.

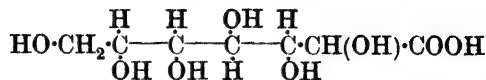
Hepta-benzoyl: m.p. 182°.

Phillippe, *Compt. rend.*, 1909, 147, 1481.

Pictet, Barbier, *Helv. Chim. Acta*, 1921, 4, 924.

Diet. of Org. Comp.—II.

d-Glucoheptonic Acid (1:2:3:4:5:6-Hexahydroxy-n-heptylic acid)



C₇H₁₄O₈ MW, 226

α-Form:

γ-Lactone: C₇H₁₂O₇. MW, 208. Prisms from H₂O. M.p. 156–7°. [α]_D²⁰ + 41° in H₂O. *Tetra-acetyl*: m.p. 128°. [α]_D²⁰ – 23.83°. 1:2:4:5:6-*Penta-Me ether*: C₁₂H₂₂O₇. MW, 278. M.p. 104°. [α]_D²⁰ – 13.2° initial, in H₂O.

Amide: C₇H₁₅O₇N. MW, 225. M.p. 134–5° (129°). [α]_D²⁰ + 10.6° in H₂O. *Hexa-acetyl*: m.p. 163°. [α]_D²⁰ + 17.4° in CHCl₃.

Nitrile: hexa-acetyl, m.p. 112.5–113.5°. [α]_D²¹ + 24.6° in CHCl₃.

δ-Lactone: 1:2:3:5:6-*Penta-Me ether*: m.p. 83°. [α]_D¹⁷ + 40° initial, + 9° final, in H₂O.

β-Form:

M.p. 134–5°.

γ-Lactone: [α]_D²⁰ + 1.4°.

Amide: m.p. 158°.

Zemplén, Kiss, *Ber.*, 1927, 60, 169.

Rehorst, *Ann.*, 1933, 503, 163.

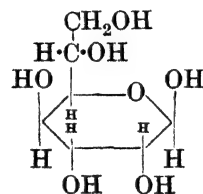
Philippe, *Ann. chim. phys.*, 1912, 26, 328.

Haworth, Hirst, Stacey, *J. Chem. Soc.*, 1932, 2483.

Levene, Meyer, *J. Biol. Chem.*, 1925, 66, 173.

Liebrecht, E.P., 8,503, (*Chem. Abstracts*, 1913, 7, 3196).

d-α-Glucoheptose



C₇H₁₄O₇ MW, 210

Cryst. from H₂O. M.p. 193°. [α]_D²⁰ – 20° in H₂O.

Methylglucoside: β-methyl-α-glucoheptoside. C₈H₁₆O₇. MW, 224. M.p. 169°. [α]_D¹⁹ – 75° in H₂O. *Penta-acetyl*: (α). M.p. 169°. [α]_D¹⁹ + 91° in CHCl₃. (β). M.p. 150°. [α]_D²¹ – 16° in CHCl₃.

2:3:4:6:7-*Penta-Me ether*: C₁₂H₂₄O₇. MW, 280. (β). M.p. 84°. [α]_D¹⁵ – 62.5°. *Methylglucoside*: methylglucoheptoside. C₁₃H₂₆O₇.

MW, 294. B.p. $140^{\circ}/0.08$ mm. n_D^{17} 1.4487. $[\alpha]_D^{21} - 97^{\circ}$ in H_2O .

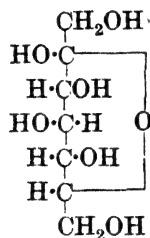
1 : 2 : 3 : 4 : 6 : 7-Hexa-acetyl: (α). M.p. 164° . $[\alpha]_D^{20} + 87^{\circ}$ in $CHCl_3$. (β). M.p. 135° . $[\alpha]_D^{20} + 4.8^{\circ}$ in $CHCl_3$.

Osazone: m.p. $194-5^{\circ}$ decomp.

Hudson, Yanovsky, *J. Am. Chem. Soc.*, 1916, **38**, 1575.

Haworth, Hirst, Stacey, *J. Chem. Soc.*, 1931, 2864 (*Bibl.*).

Glucoheptulose



$C_7H_{14}O_7$

MW, 210

d.

M.p. 171.4° . $[\alpha]_D^{20} + 67.4^{\circ}$ in H_2O . Reduces Fehling's.

α -Methylglucoside: $C_8H_{16}O_7$. MW, 224. M.p. $138-40^{\circ}$. $[\alpha]_D^{22} + 108.5^{\circ}$ in H_2O . Penta-acetyl: m.p. 110° . $[\alpha]_D^{22} + 78.5^{\circ}$ in $CHCl_3$.

1 : 2 : 3 : 4 : 5 : 7-Hexa-acetyl: m.p. 112° . $[\alpha]_D^{22} + 87.0^{\circ}$.

Osazone: m.p. $209-10^{\circ}$.

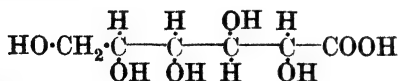
l.

M.p. 173° . $[\alpha]_D - 67.8^{\circ}$ in H_2O .

Austin, *J. Am. Chem. Soc.*, 1932, **54**, 1925, 1933.

Bertrand, Nitzberg, *Bull. soc. chim.*, 1928, **43**, 1019.

Gluconic Acid (1 : 2 : 3 : 4 : 5-Pentahydroxycaproic acid)



$C_6H_{12}O_7$

MW, 196

d.

Syrup, readily converted to the lactone.

Et ester: $C_8H_{16}O_7$. MW, 224. M.p. $62-3^{\circ}$. Penta-acetyl deriv.: m.p. 103.5° .

γ -Lactone: $C_6H_{10}O_6$. MW, 178. M.p. $134-6^{\circ}$. $[\alpha]_D + 67.5^{\circ}$ initial, $+ 6.2^{\circ}$ final, in H_2O . Tetra-acetyl: m.p. 103° . $[\alpha]_D^{20} + 13.5^{\circ}$. 2 : 3 : 6-Tri-Me ether: $C_9H_{16}O_6$. MW, 220. M.p. $29-$

30° . B.p. $130^{\circ}/0.05$ mm. $[\alpha]_D^{18} + 55^{\circ}$ initial, $+ 37.5^{\circ}$ final. Tetra-Me ether: $C_{10}H_{18}O_6$. MW, 234. M.p. $26-27.5^{\circ}$. n_D^{20} 1.4770. $[\alpha]_D^{20} + 72^{\circ}$ initial, $+ 38.8^{\circ}$ final, in H_2O .

δ -Lactone: m.p. 153° . $[\alpha]_D + 63.5^{\circ}$ initial, $+ 6.2^{\circ}$ final. Tetra-Me ether: b.p. $101^{\circ}/0.06$ mm. n_D^{14} 1.4565. $[\alpha]_D^{22} + 101^{\circ}$ initial, $+ 29.6^{\circ}$ final, in H_2O .

Amide: $C_6H_{13}O_6N$. MW, 195. M.p. $143-4^{\circ}$. $[\alpha]_D^{20} + 31.2^{\circ}$ in H_2O .

Methylamide: $C_7H_{15}O_6N$. MW, 209. M.p. 127° .

Nitrile: $C_6H_{11}O_6N$. MW, 177. M.p. 146° . Penta-acetyl deriv.: m.p. $83-4^{\circ}$. $[\alpha]_D^{22} + 46.2^{\circ}$ in $CHCl_3$.

Penta-Me ether: $C_{11}H_{27}O_7$. MW, 266. B.p. $155^{\circ}/1$ mm. $[\alpha]_D^{20} + 22.5^{\circ}$ in H_2O . Me ester: $C_{12}H_{24}O_7$. MW, 280. B.p. $100^{\circ}/1$ mm. n_D^{15} 1.4412.

l.

γ -Lactone: m.p. $134-5^{\circ}$. $[\alpha]_D - 68.7^{\circ}$ initial, $- 13.7^{\circ}$ final in H_2O .

Carrington, Haworth, Hirst, *J. Am. Chem. Soc.*, 1933, **55**, 1084.

Auriscichio, *Industria chimica*, 1933, **8**, 836.

Wohl, Wollenberg, *Ann.*, 1933, **500**, 281.

Brackenbury, Upson, *J. Am. Chem. Soc.*, 1933, **55**, 2512 (*Bibl.*).

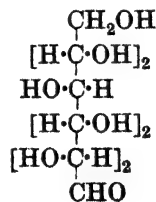
Haworth, Hirst, Miller, *J. Chem. Soc.*, 1927, 2439.

Upson, Sands, Whitnah, *J. Am. Chem. Soc.*, 1928, **56**, 519.

Gluconolactone.

See Lactones under Gluconic Acid.

$\alpha\alpha\alpha$ -d-Gluco-nonose



$C_9H_{18}O_9$

MW, 270

$[\alpha]_D^{15} + 13.5^{\circ}$ in H_2O .

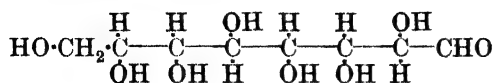
Phenylhydrazone: m.p. $224-5^{\circ}$.

Osazone: m.p. 244° .

Philippe, *Ann. chim.*, 1912, **26**, 362.

Fischer, *Ann.*, 1892, **270**, 104.

Anderson, *J. Am. Chem. Soc.*, 1911, **33**, 1513.

α -*d*-Gluco-octose $\text{C}_8\text{H}_{16}\text{O}_8$

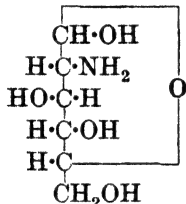
MW, 240

 α -Form :

Cryst. + $2\text{H}_2\text{O}$. M.p. 93° (110 – 15°). $[\alpha]_D^{18}$ – 86.3° initial, – 49.6° final, in H_2O .

 β -Form :Non-cryst. $[\alpha]_D$ – 28.1° .Phenylhydrazone : m.p. 203 – 4° .Osazone : m.p. 229 – 30° .Philippe, *Ann. chim.*, 1912, **26**, 345.Fischer, *Ann.*, 1892, **270**, 95.

See also last reference above.

Glucosamine (*Chitosamine*) $\text{C}_6\text{H}_{13}\text{O}_5\text{N}$

MW, 179

d-.

Occurs in the skeletal polysaccharide chitin of insects, crustacea and fungi. Needles from EtOH . M.p. 110° decomp. Sol. H_2O , hot MeOH . Spar. sol. EtOH . Insol. Et_2O , CHCl_3 . $[\alpha]_D + 44^\circ$ in H_2O . HNO_2 — chitose.

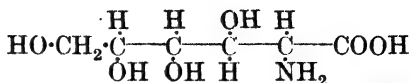
B, HCl : (α). $[\alpha]_D + 100^\circ$ initial, + 72.5° final, in H_2O . (β). $[\alpha]_D + 25^\circ$ initial, + 72.6° final, in H_2O .

Methylglucoside : hydrochloride, m.p. 185 – 7° decomp. $[\alpha]_D^{20} - 24.2^\circ$ in H_2O . 3 : 4 : 6-*Tri-acetyl* : hydrobromide, m.p. 230 – 3° . $[\alpha]_D + 20.6^\circ$ in CHCl_3 .

N-Acetyl : darkens at 150° , decomp. at 190° . $[\alpha]_D + 41.8^\circ$ in H_2O .

Tetra-acetyl deriv. : m.p. 143° . *N-acetyl* : (α). M.p. 187° (188 – 9°). (β). M.p. 139 – 40° .

Oxime : m.p. about 127° . *Hydrochloride* : m.p. 166° .

Semicarbazone : m.p. 165° decomp.*Osazone* : m.p. 210° .Levene, *Chemical Reviews*, 1925, **2**, 179 (*Bibl.*).Hynd, Macfarlane, *Biochem. J.*, 1926, **20**, 1264.Komori, *Chem. Abstracts*, 1927, **21**, 372.van Alphen, *Chem. Abstracts*, 1930, **24**, 2113.Micheel, Micheel, *Ber.*, 1932, **65**, 253.Glucosaminic Acid (*Chitosaminic acid*, 2 : 3 : 4 : 5-tetrahydroxy-1-aminoproic acid) $\text{C}_6\text{H}_{13}\text{O}_6\text{N}$

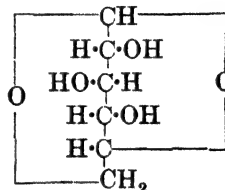
MW, 195

d-.

Plates or needles from H_2O . Decomp. above 250° . $[\alpha]_D^{18} + 14.31^\circ$ in 2.5% HCl.Aq.

l-.

Leaflets or needles from H_2O . Chars at 250° . Sol. hot EtOH . Insol. Et_2O . $[\alpha]_D^{18} - 14.49^\circ$ in 2.5% HCl.Aq.

Nitrile : penta-acetyl, m.p. 118 – 19° .Levene, *J. Biol. Chem.*, 1918, **36**, 77.Pringsheim, Ruschmann, *Ber.*, 1915, **48**, 680.Bergmann, Zervas, Silberkweit, *Ber.*, 1931, **64**, 2428. β -Glucosan (1 : 6-Anhydroglucose, *laevo-glucosan*) $\text{C}_6\text{H}_{10}\text{O}_5$

MW, 162

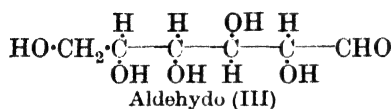
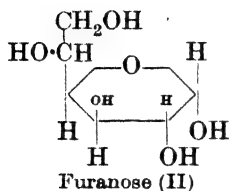
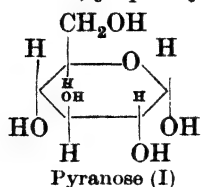
Plates or prisms. M.p. 179 – 80° . Very sol. H_2O . Sol. MeOH , EtOH . Insol. Et_2O . Does not reduce Fehling's. $[\alpha]_D - 66.2^\circ$ in H_2O . Dil. acids —> glucose.

2 : 3 : 4-*Tri-Me ether* : $\text{C}_9\text{H}_{16}\text{O}_5$. MW, 204. M.p. 63 – 4° . B.p. $135.5/12$ mm. $[\alpha]_D^{20} - 63.5^\circ$ in H_2O .

2 : 3 : 4-*Tri-acetyl* : needles from AcOEt . M.p. 110° . $[\alpha]_D - 45.5^\circ$ in EtOH .

Tribenzoyl : cryst. from AcOH . M.p. 199 – 5 – 200° .

Venn, *Chem. Abstracts*, 1925, **19**, 41.Irvine, Oldham, *J. Chem. Soc.*, 1921, **119**, 1744.Karrer, Smirnof, *Helv. Chim. Acta*, 1921, **4**, 817.Pictet, Sarasin, *Helv. Chim. Acta*, 1918, **1**, 87.Josephson, *Ber.*, 1929, **62**, 313.

Glucose (*Dextrose, grape-sugar*) $C_6H_{12}O_6$

MW, 180

d. **Pyranose form, (I).**

Occurs free in many fruits and in plant products as glucosides. α -Form: cryst. from 70% EtOH at ord. temps. M.p. 146° . $[\alpha]_D^{20} + 111.2^\circ$ initial, $+ 52.5^\circ$ final, in H_2O . β -Form: cryst. from H_2O above 98° . M.p. $148-50^\circ$. $[\alpha]_D^{20} + 17.5^\circ$ initial, $+ 52.5^\circ$ final, in H_2O .

Sol. H_2O , hot EtOH, hot Py. Heat of comb. 677.2 (673.7) Cal. Reduces Tollen's, Fehling's, and Barfoed's reagents. Ox. \rightarrow gluconic acid \rightarrow saccharic acid. Red. \rightarrow sorbitol. Forms bisulphite comp. Restores colour slowly to Schiff's reagent. Forms add. comps. (glucosates) with metallic oxides.

Methylglucoside: $C_7H_{14}O_6$. MW, 194.

α -Form: needles from abs. EtOH. M.p. 166° . $[\alpha]_D^{20} + 158.9^\circ$ in H_2O . 2:3:4:6-Tetra-Me ether: syrup. B.p. $89-92^\circ/0.4$ mm. $[\alpha]_D^{25} + 151^\circ$ in H_2O . D_4^{20} 1.0944. n_D^{20} 1.4460. 2:3:4:6-Tetra-acetyl: m.p. 100° . $[\alpha]_D^{20} + 130.5^\circ$ in $CHCl_3$.

β -Form: prisms from EtOH. M.p. 105° . $[\alpha]_D^{20} - 34.2^\circ$ in H_2O . 2:3:4-Tri-Me ether: needles from pet. ether. M.p. $93-4^\circ$. $[\alpha]_D - 22.9^\circ$ in MeOH. 2:3:6-Tri-Me ether: cryst. from pet. ether. M.p. 57.5° . $[\alpha]_D^{20} - 29.3^\circ$ in MeOH. 2:3:4:6-Tetra-Me ether: needles from pet. ether. M.p. $40-1^\circ$. $[\alpha]_D - 17.43^\circ$ in EtOH. 2:3:4:6-Tetra-acetyl: cryst. from MeOH. M.p. 104.5° . $[\alpha]_D^{20} - 18.2^\circ$ in $CHCl_3$.

2-Me ether: prisms from EtOH. M.p. 158° . $[\alpha]_D^{20} + 34.6^\circ$ initial, $+ 66^\circ$ final, in H_2O . Phenylhydrazone: m.p. 177° . $[\alpha]_D^{19} - 13.3^\circ$ in Py.

3-Me ether: α -form. Plates from MeOH.

M.p. $160-1^\circ$. $[\alpha]_D^{17} + 104.3^\circ$ initial, $+ 55.3^\circ$ final, in H_2O . β -Form: prismatic needles from $Me_2CO-MeOH$. M.p. $133.5-135^\circ$. $[\alpha]_D^{20} + 31.9^\circ$ initial, $+ 55.1^\circ$ final, in H_2O . Osazone: m.p. $178-9^\circ$. $[\alpha]_D - 109^\circ$ initial, $- 9^\circ$ final, in EtOH. Tetra-acetyl: cryst. from EtOH. M.p. $95-6^\circ$.

6-Me ether: needles from EtOH. M.p. $153-4^\circ$. $[\alpha]_D^{20} + 104.5^\circ$ initial, $+ 58.5^\circ$ final, in H_2O . Osazone: cryst. from EtOH. M.p. 183° . Tetra-acetyl: cryst. from EtOH. M.p. $95-6^\circ$. $[\alpha]_D^{20} + 21.5^\circ$.

2:3:4-Tri-Me ether: $C_9H_{18}O_6$. MW, 222. Syrup. B.p. $162-6^\circ/0.3$ mm. $[\alpha]_D^{20} + 42.7^\circ$ ($+ 66.8^\circ$) in H_2O .

2:3:6-Tri-Me ether: needles from EtOH. M.p. 124° . B.p. $165-70^\circ/0.4$ mm. $[\alpha]_D^{18} + 118^\circ$.

2:3:4:6-Tetra-Me ether: $C_{10}H_{20}O_6$. MW, 236. α -Form: needles from pet. ether. M.p. 96° . n_D 1.4588. $[\alpha]_D^{20} + 100.8^\circ$ initial, $+ 83.3^\circ$ final, in H_2O . β -Form: m.p. 50° . B.p. $125^\circ/0.5$ mm. $[\alpha]_D^{20} + 73.1^\circ$ initial, $+ 83.1^\circ$ final, in H_2O .

Ethylglucoside: $C_8H_{16}O_6$. MW, 208. α -Form: m.p. $113-14^\circ$. $[\alpha]_D^{20} + 150.3^\circ$. β -Form: m.p. 73° . $[\alpha]_D^{20} - 33.4^\circ$.

2:3:4:6-Tetra-acetyl: (β). Cryst. from EtOH. M.p. 117° . $[\alpha]_D^{20} + 2.2^\circ$ in EtOH.

2:3:4:6-Tetra-acetyl bromo: see Acetobromoglucose.

Penta-acetyl: α -form, needles from EtOH. M.p. $112-13^\circ$. $[\alpha]_D^{20} + 101.6^\circ$ in $CHCl_3$. β -Form: cryst. from EtOH. M.p. 134° . $[\alpha]_D^{20} + 3.8^\circ$.

2:3:4:6-Tetrabenzoyl: needles from ligroin. M.p. $119-20^\circ$. $[\alpha]_D^{21} + 70.6^\circ$ in EtOH.

Pentabenzoyl: (α). Needles from AcOEt. M.p. 157° . $[\alpha]_D^{22} + 107.6^\circ$ in $CHCl_3$. (β). Needles from AcOEt. M.p. 187° . $[\alpha]_D^{24} + 23.7^\circ$ in $CHCl_3$.

6-Triphenylmethyl: needles $+ 2C_2H_5OH$ from EtOH. M.p. $57-8^\circ$. $[\alpha]_D^{22} + 59.6^\circ$ in Py. Tetra-acetyl: needles from EtOH. M.p. $129-31^\circ$. $[\alpha]_D^{27} + 97.8^\circ$ in Py.

Oxime: m.p. 136.7° . $[\alpha]_D - 2.2^\circ$ in H_2O .

Osazone: m.p. 210° .

3:4-Dibromophenylhydrazone: m.p. $165-7^\circ$.

3:4-Dibromophenyllosazone: m.p. $225-6^\circ$ decomp.

2:5-Dibromophenyllosazone: m.p. $228-9^\circ$.

3:5-Dibromophenyllosazone: m.p. 172° .

West, Holden, *J. Am. Chem. Soc.*, 1934, **56**, 930.

Hagen, U.S.P., 1,928,891, (*Chem. Abstracts*, 1933, **27**, 6006).

Coles, *Iowa State College Journal of Science*, 1932, **6**, 33, 43 (*Bibl.*).

Oldham, Rutherford, *J. Am. Chem. Soc.*, 1932, **54**, 1086.

Levene, Raymond, *J. Biol. Chem.*, 1932, **97**, 751.

Hirst, *J. Chem. Soc.*, 1926, 350.

Fischer, *Ber.*, 1890, **23**, 2618.

Charlton, Haworth, Herbert, *J. Chem. Soc.*, 1931, 2855.

d. Furanose form, (II).

Methylglucoside: α -Form. Needles from AcOEt. M.p. 62–3°. $[\alpha]_D^{25} + 136^\circ$ in MeOH. 5:6-Monocarbonate: m.p. 130°. $[\alpha]_D^{25} + 130^\circ$ in MeOH. *Tetra-Me ether*: m.p. 11°. B.p. 94°/0.04 mm. n_D^{25} 1.4457. $[\alpha]_D^{15} + 106.5^\circ$ in MeOH. β -Form: syrup. $[\alpha]_D^{20} - 77^\circ$ in H₂O. 2:3:5:6-Tetra-Me ether: syrup. B.p. 117°/0.2 mm. $[\alpha]_D^{20} - 28.8^\circ$ in CHCl₃.

Ethylglucoside: α -Form. Needles from AcOEt. M.p. 82–3°. $[\alpha]_D^{25} + 98^\circ$ in H₂O. 5:6-Monocarbonate: m.p. 138–40°. $[\alpha]_D^{25} + 117^\circ$ in EtOH. β -Form: cryst. from AcOEt–Et₂O. M.p. 59–60°. $[\alpha]_D^{20} - 86^\circ$ in H₂O. 5:6-Monocarbonate: m.p. 164–5°. $[\alpha]_{461}^{19} - 55.0^\circ$ in H₂O.

1:2-Monoacetone deriv.: cryst. from AcOEt. M.p. 156–7°. $[\alpha]_D^{20} - 11.0^\circ$ in H₂O. *Tri-Me ether*: syrup. B.p. 138–9°/12 mm. $[\alpha]_D - 29.5^\circ$ in MeOH.

1:2:5:6-Di-acetone deriv.: needles from pet. ether. M.p. 109–10°. $[\alpha]_D^{17} - 18.6^\circ$ in H₂O. 3-Me ether: b.p. 105–6°/0.3 mm. $[\alpha]_D^{27} - 31.4^\circ$. n_D^{17} 1.4518.

Pentabenzoyl: (α). Cryst. from EtOH. M.p. 118–20°. $[\alpha]_D^{20} + 79^\circ$ in CHCl₃. (β). Cryst. from EtOH. M.p. 146–7°. $[\alpha]_D^{20} - 82.0^\circ$ in CHCl₃.

Josephson, *Ber.*, 1929, **62**, 1913.

Micheel, Hess, *Ann.*, 1926, **450**, 21.

Pringsheim, Koloduy, *Ber.*, 1926, **59**, 1135.

Haworth, Porter, Waine, *J. Chem. Soc.*, 1932, 2254.

d. Aldehyde form, (III).

Penta-Me ether: b.p. 108–10°/0.4 mm. $[\alpha]_D^{20} - 35.1^\circ$ in C₂H₅Cl₄. *Di-Me acetal*: b.p. 95°/0.8 mm. $[\alpha]_D^{20} + 15.09^\circ$ in MeOH. *Di-Et mercaptal*: b.p. 152°/0.6 mm. $[\alpha]_D^{20} + 19.2^\circ$ in MeOH.

Penta-acetyl: plates from Me₂CO–Et₂O. M.p. 116–18°. $[\alpha]_D^{25} + 2.7^\circ$ in C₂H₅Cl₄. *Di-Et mercaptal*: cryst. from MeOH. Aq. M.p. 45–7°. $[\alpha]_D^{20} + 11.4^\circ$ in CHCl₃.

Pentabenzoyl: semi-acetal, plates from EtOH. M.p. 76–82°. $[\alpha]_D^{17} + 37.1^\circ$ in EtOH. *Di-Et*

mercaptal: plates from EtOH. M.p. 97–8°. $[\alpha]_D^{19} + 49.6^\circ$ in CHCl₃.

Levene, Meyer, *J. Biol. Chem.*, 1926, **69**, 175.

Brigl, Mühlischlegel, *Ber.*, 1930, **63**, 1551.

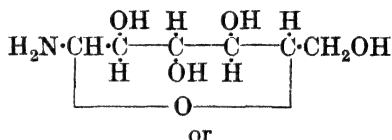
Wolf from, *J. Am. Chem. Soc.*, 1929, **51**, 2190.

l.

Prism from MeOH–EtOH. M.p. 141–3°. Sol. H₂O. Spar. sol. EtOH. $[\alpha]_D^{20} - 51.4^\circ$ final.

Fischer, *Ber.*, 1890, **23**, 2618.

Glucosimine



C₆H₁₃O₃N

MW, 147

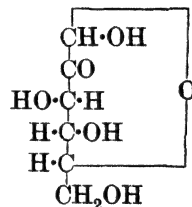
Needles from 95% MeOH. M.p. 127–8° decomp. (122–3°). Sol. H₂O. Insol. EtOH, Et₂O. Dil. acids \rightarrow glucose.

Levene, *J. Biol. Chem.*, 1915, **24**, 60.

Irvine, Thomson, Garnett, *J. Chem. Soc.*, 1913, **103**, 239.

Hynd, Macfarlane, *Biochem. J.*, 1926, **20**, 1264.

Glucosone (Fructosone, mannosone)



C₆H₁₀O₆

MW, 178

d.

Syrup. Sol. EtOH. Insol. Et₂O. Lavo-ratory in H₂O. Reduces cold Fehling's. Baryta water \rightarrow gluconic acid. Zn + AcOH \rightarrow *d*-fructose. Phenylhydrazine \rightarrow glucos-azone.

Triacetyl deriv.: cryst. from CHCl₃–pet. ether. M.p. 76°. $[\alpha]_D^{19} + 84.2^\circ$ in 40% EtOH.

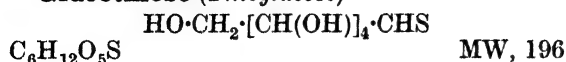
3:4:6-Triacetyl-1-benzoyl: cryst. from EtOH. M.p. 116°. $[\alpha]_D^{19} + 144.3^\circ$ in CHCl₃.

dl. See α -Acrosone.

Dixon, Harrison, *Biochem. J.*, 1932, **26**, 1954.

Maurer, Petsch, *Ber.*, 1933, **66**, 995.

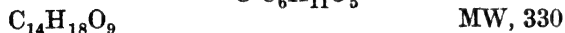
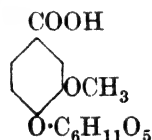
Fischer, Tafel, *Ber.*, 1889, **22**, 88, 98.

Glucothiose (Thioglucose)Amorphous solid + 1H₂O. α -.

Penta-acetyl deriv. : m.p. 128-9° (121°).

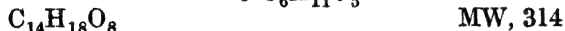
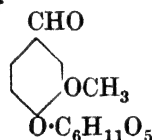
 β -.

Tetra-acetyl deriv. : cryst. from MeOH. M.p. 113-14°. $[\alpha]_D^{20} - 2.13^\circ$ in C₂H₂Cl₄. Methyl-glucoside : m.p. 94-5°. $[\alpha]_D^{20} - 18.6^\circ$ in C₂H₂Cl₄. Benzoyl deriv. : cryst. from EtOH. M.p. 126°. $[\alpha]_D^{20} - 12.4^\circ$ in C₂H₂Cl₄.

Kahlbaum, D.R.P., 557,247, (*Chem. Abstracts*, 1933, 27, 374).Schneider, Bansa, *Ber.*, 1931, 64, 1322.**Glucovanillic Acid**

Prisms + H₂O from H₂O. M.p. 211-12°. Sol. EtOH, hot H₂O. Insol. Et₂O. Emulsin \rightarrow glucose + vanillic acid.

Tetra-acetyl deriv. : needles from dil. EtOH. M.p. 181-2°. Me ester : needles from MeOH. M.p. 144-5°.

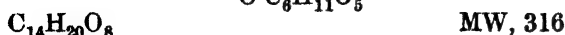
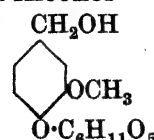
Mauthner, *J. prakt. Chem.*, 1911, 83, 556.**Glucovanillin**

Needles + 2H₂O from EtOH.Aq. M.p. 192°. Mod. sol. H₂O. Spar. sol. EtOH. Insol. Et₂O. $[\alpha]_D^{20} - 88.03^\circ$ in H₂O.

Tetra-acetyl deriv. : m.p. 143-4°. $[\alpha]_D^{20} - 50.68^\circ$ in Me₂CO.

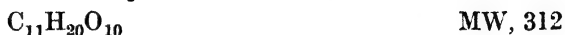
Oxime : m.p. 152°.

Phenylhydrazone : m.p. 195°.

Goris, *Compt. rend.*, 1924, 179, 70.Robertson, Waters, *J. Chem. Soc.*, 1930, 2733.**Glucovanillyl Alcohol**

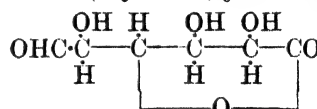
Needles + H₂O. M.p. 120°. Sol. H₂O, EtOH. Insol. Et₂O. Emulsin \rightarrow glucose + vanillyl alcohol.

See first reference above and also Tiemann, *Ber.*, 1885, 18, 1597.

Glucosylose

Occurs as mixture of dibenzoyl derivs. in leaves and stem of *Daviesia Latifolia*, R.Br. Amorph., hygroscopic solid. Sol. H₂O, MeOH. Mod. sol. EtOH. Does not reduce Fehling's or form an osazone.

Di-benzoyl deriv. : (1) m.p. 152-3°. $[\alpha]_D - 105.9^\circ$ in MeOH. Penta-acetyl deriv., m.p. 203°. (2) Isodibenzoylglucosylose. Needles from H₂O. M.p. 173-4°. Penta-acetyl deriv., m.p. 173-4°.

Tutin, *J. Chem. Soc.*, 1915, 107, 7.**d-Glucurone (Glycurone, glucuronolactone)**

Cryst. from H₂O. M.p. 177°. Sol. H₂O. Insol. EtOH. $[\alpha]_D^{25} + 19.4^\circ$ in H₂O.

Diacetyl deriv. : m.p. 130-1°.

Diacetyl-chloro deriv. : C₁₀H₁₁O₇Cl. MW, 278.5. M.p. 107.5-108.5°. $[\alpha]_D^{25} + 95.5^\circ$ in CHCl₃.

Triacetyl deriv. : (α). Plates from Et₂O. M.p. 110-12°. $[\alpha]_D^{24} + 203.6^\circ$ in CHCl₃. (β). Prisms from EtOH. M.p. 194-5°. $[\alpha]_D^{25} + 84.1^\circ$ in CHCl₃.

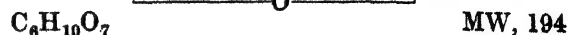
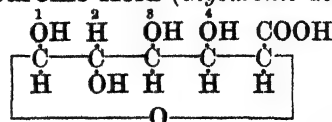
 α -Benzoyl deriv. : m.p. 98-102° decomp.Oxime : m.p. 151°. $[\alpha]_D + 14.4^\circ$ in H₂O.

Semicarbazone : m.p. 188-9° decomp. (slow heat.).

Thiosemicarbazone : m.p. 223°.

Phenylhydrazone : m.p. 160°.

p-Bromophenylhydrazone : m.p. 144° decomp. unsym.-Diphenylhydrazone : m.p. 150°.

Vedder, *Chem. Abstracts*, 1933, 27, 2183.Goebel, Babers, *J. Biol. Chem.*, 1933, 100, 573, 743; 101, 173.Killiani, *Ber.*, 1926, 59, 1469.Zervas, Sessler, *Ber.*, 1933, 66, 1327.**d-Glucuronic Acid (Glycuronic acid)**

M.p. 156°. Sol. EtOH. Reduces Fehling's and Tollen's reagents. $[\alpha]_D^{20} + 36.00^\circ$ in H_2O . $NaOI \rightarrow$ saccharic acid.

2 : 3 : 4-*Tri-Me ether*: $C_9H_{16}O_7$. MW, 236. Yellow syrup. $n_D^{18} 1.4709$. $[\alpha]_D^{18} + 58^\circ$. *Methyl-glucoside*: needles. M.p. 133°. $[\alpha]_D^{23} - 38^\circ$ in H_2O .

Lactone: see Glucurone.

p-Bromophenylosazone: m.p. 199°.

Bergmann, Wolff, *Ber.*, 1923, 56, 1060.

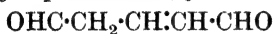
Weinmann, *Ber.*, 1929, 62, 1637.

Ehrlich, Rehorst, *Ber.*, 1929, 62, 628.

Zervas, Sessler, *Ber.*, 1933, 66, 1326.

Challinor, Haworth, Hirst, *J. Chem. Soc.*, 1931, 258.

Glutacondialdehyde (4-Hydroxy-1-aldehydo-butadiene, 1 : 3-dialdehydopropylene, propylene 1 : 3-dialdehyde pentenedial, glutaconic aldehyde)



or



$C_5H_6O_2$ MW, 98

Neither the dialdehyde (I) nor its enol form (II) has been isolated in the free state. $NaHSO_3$ forms a bis-bisulphite comp.

Enol form (II):

Acetate: $C_7H_8O_3$. MW, 140. Brownish needles from pet. ether. M.p. 75°.

Benzoate: $C_{12}H_{10}O_3$. MW, 202. Yellow needles from hot EtOH. M.p. 116–18°.

Di-anil monohydrochloride: crimson needles from MeOH. M.p. 139–40°.

Na salt: $C_5H_5O_2Na \cdot 2H_2O$. Dark red leaflets from H_2O . Gives coloured ppts. with aq. sols. of metallic salts.

Ba salt: $(C_5H_5O_2)_2Ba \cdot 5H_2O$. Yellowish-red cryst. powder.

Baumgarten, Glatzel, *Ber.*, 1926, 59, 2658.

Glutaconic Acid (Propylene-1 : 3-dicarboxylic acid)



$C_5H_6O_4$ MW, 130

Labile (cis-) form:

Short prisms from Et_2O . M.p. 136°. Sol. H_2O , EtOH, Me_2CO . Spar. sol. Et_2O . Insol. $CHCl_3$, C_6H_6 . $k = 1.43 \times 10^{-4}$ at 0°. Stable in solid state and in Et_2O sol. Changes on melting and in H_2O sol. to *trans*-form. Ac_2O at 40° \rightarrow hydroxy-anhydride.

Monoanilide: m.p. 135°.

Stable (trans-) form:

Flat needles from $Et_2O-C_6H_6$. M.p. 138°. Sol. H_2O , EtOH, Et_2O . $k = 1.74 \times 10^{-4}$ at 0°. Does not give anhydride with Ac_2O at 40°.

Chloro-anhydride: 6-chloro- α -pyrone. $C_5H_3O_2Cl$. MW, 130.5. M.p. 27°.

Hydroxy-anhydride: 6-hydroxy- α -pyrone. $C_5H_4O_3$. MW, 112. Needles from C_6H_6 . M.p. 87–8°. $FeCl_3 \rightarrow$ intense green col. changing rapidly to pale brown.

Di-Et ester: $C_9H_{14}O_4$. MW, 186. B.p. 236–8°, 132–4°/18 mm., 124–5°/12 mm. $D_4^{20} 1.0496$. $n_D^{20} 1.4470$.

Monoanilide: m.p. 167°.

Dianilide: m.p. 228°.

Gidvani, *J. Chem. Soc.*, 1932, 2666.

McCombs, Packer, Thorpe, *J. Chem. Soc.*, 1931, 547, 559.

Malachowski, *Ber.*, 1929, 62, 1323.

Ingold, Thorpe, *J. Chem. Soc.*, 1921, 119, 499.

Glutaconic Aldehyde.

See Glutacondialdehyde.

Glutamic Acid (1-Aminoglutaric acid, 1-aminopropane-1 : 3-dicarboxylic acid)



$C_5H_9O_4N$ MW, 147

d.
Product of acid hydrolysis of many plant and animal proteins. The Na salt has a meaty flavour and is used in meat extracts and as a condiment particularly in the Far East.

Rhombic cryst. from EtOH.Aq. M.p. 224–5° (247–9°) decomp. Spar. sol. H_2O . Very spar. sol. EtOH. Heat of comb. C_p 366 Cal. $[\alpha]_D^{25} + 11.0^\circ$ in H_2O , $[\alpha]_D^{20} + 34.9^\circ$ in 10% HCl.Aq.

B,HCl: m.p. 202° decomp., 213° (rapid heat.).

Mono-Et ester: $C_7H_{13}O_4N$. MW, 175. Prisms from 50% EtOH. M.p. 194° (164°).

Hydrochloride: m.p. 134°.

Di-Et ester: $C_9H_{17}O_4N$. MW, 203. Oil. B.p. 139–40°/10 mm. Very sol. H_2O .

N-Acetyl: $C_7H_{11}O_5N$. MW, 189. M.p. 199°.

3-*Monoamide*: glutamine. $C_5H_{10}O_3N_2$. MW, 146. Occurs widespread in plants. Needles from EtOH.Aq. M.p. 184–5°. Sol. H_2O . Very spar. sol. EtOH. $[\alpha]_D^{19} + 8^\circ$ in H_2O , $[\alpha]_D^{20} + 32^\circ$ in 5% HCl.Aq. *N-Chloroacetyl*: $C_7H_{11}O_4N_2Cl$. MW, 222.5. Needles from AcOEt. M.p. 130–2°. $[\alpha]_D^{15} - 104^\circ$ in H_2O .

1-*Monoamide*: isoglutamine. Cryst. Sol. H_2O . Very spar. sol. org. solvents. $[\alpha]_D^{23} + 21.1^\circ$ in H_2O .

l.

Leaflets from H_2O . M.p. 213° decomp. (rapid

heat.). Tasteless. $[\alpha]_D^{25} - 12.9^\circ$ in H_2O , $[\alpha]_D^{19} 31.1^\circ$ in $HCl.Aq.$

dl.

Rhombic cryst. from H_2O . M.p. 199° ($225-7^\circ$) decomp. Sol. hot H_2O . Spar. sol. cold H_2O , $EtOH$, Et_2O , CS_2 , ligroin.

B.HCl: m.p. 193° decomp.

Mono-Et ester: m.p. 185° .

N-Chloroacetyl: cryst. M.p. 123° .

Picrolonate: decomp. at 184° .

Abderhalden, Nienburg, *Z. physiol. Chem.*, 1933, **219**, 155.

Bergmann, Zervas, Salzmann, *Ber.*, 1933, **66**, 1290.

Tseng, Chu, *Chem. Abstracts*, 1933, **27**, 708, 1867; 1932, **26**, 5548.

King, *Organic Syntheses*, 1932, Collective Vol. I, 281.

Dunn, Smart, Redemann, Brown, *J. Biol. Chem.*, 1931, **94**, 599.

Fischer, Kropp, Stahlschmidt, *Ann.*, 1909, **365**, 183.

Bergmann, Zervas, *Ber.*, 1932, **65**, 1197; *Z. physiol. Chem.*, 1933, **221**, 51.

Han, *Ind. Eng. Chem.*, 1929, **21**, 984.

Dyson, *Chemical Age (London)*, 1931, **24**, 328.

Glutamine.

See under Glutamic Acid.

Glutaraldehyde (*Glutaric dialdehyde, propane-1 : 3-dial, 1 : 3-dialdehydopropane*)



$C_5H_8O_2$ MW, 100

Oil. B.p. $187-9^\circ$ decomp., $71-2^\circ/10$ mm. Sol. H_2O . Volatile in steam. Polymerises in presence of $H_2O \rightarrow$ "glassy" form which on dist. in vacuo regenerates the dialdehyde.

Dioxime: needles from H_2O . M.p. 175° (178° , 171°). Sublimes without decomp. Hot min. acids \rightarrow pyridine.

Fischer, Düll, Ertel, *Ber.*, 1932, **65**, 1471.

Shaw, *J. Chem. Soc.*, 1925, **127**, 215.

v. Braun, Sobiecki, *Ber.*, 1911, **44**, 2533.

Glutaric Acid (*Propane-1 : 3-dicarboxylic acid*)



$C_5H_8O_4$ MW, 132

Needles from C_6H_6 . M.p. $97-8^\circ$. B.p. $302-4^\circ$, $200^\circ/20$ mm. Very sol. H_2O , $EtOH$, Et_2O . k (first) = 4.73×10^{-5} at 25° , (second) = 2.9×10^{-6} at 25° .

Anhydride: $C_5H_6O_3$. MW, 114. Cryst. from Et_2O . M.p. 56° . B.p. $150^\circ/10$ mm.

Mono-Me ester: $C_6H_{10}O_4$. MW, 146. B.p. $150-1^\circ/10$ mm. $D_4^{18} 1.164$. $n_D^{18} 1.4392$.

Di-Me ester: $C_7H_{12}O_4$. MW, 160. B.p. $84-5^\circ/6$ mm. $D_4^{20} 1.0876$. $n_D^{20} 1.4246$.

Mono-Et ester: $C_7H_{12}O_4$. MW, 160. B.p. $143-5^\circ/7$ mm.

Di-Et ester: $C_9H_{16}O_4$. MW, 188. B.p. $103-4^\circ/7$ mm. $D_4^{20} 1.022$. $n_D^{20} 1.4241$.

p-Bromophenacyl ester: m.p. 137° .

Dichloride: $C_5H_6O_2Cl_2$. MW, 169. B.p. $107-8^\circ/16$ mm. $D_4^{22} 1.3221$.

Diamide: $C_5H_{10}O_2N_2$. MW, 130. Leaflets. M.p. $175-6^\circ$.

Mono-nitrile: see 3-Cyanobutyric Acid.

Di-nitrile: trimethylene cyanide, 1 : 3-dicyanopropane. $C_3H_6N_2$. MW, 94. B.p. $144-7^\circ/13$ mm., $131-4^\circ/10$ mm.

Imide: $C_5H_7O_2N$. MW, 113. Glistening scales from H_2O . M.p. 152° .

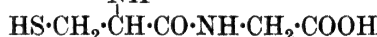
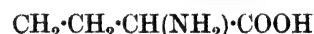
Marvel, Tuley, *Organic Syntheses*, 1932, Collective Vol. I, 283.

Boedtker, *J. pharm. chim.*, 1932, **15**, 225.

Berner, *Z. physik. Chem.*, 1929, **141A**, 116.

Fourneau, Sabetay, *Bull. soc. chim.*, 1929, **45**, 838.

Glutathione (*Glutamylcysteinylglycine*)



$C_{10}H_{17}O_6N_3S$ MW, 307

Basic respiratory peptide occurring in plant and animal tissues. Cryst. M.p. $190-2^\circ$ decomp. Unstable. $[\alpha]_D^{25} - 9.4^\circ$ in H_2O , -85° in 10% $HCl.Aq.$ Incubated + H_2O at $62^\circ \rightarrow$ pyrrolidone-carboxylic acid + cysteinylglycine. Acid hyd. \rightarrow glycine + glutamic acid + cysteine. Addition of Cu_2O to the sol. in 0.5N/ $H_2SO_4 \rightarrow$ insol. cryst. Cu^+ deriv.

Cu' deriv.: $[\alpha]_D^{25} + 45.6^\circ$ in $HCl.Aq.$

Phenylcarbamylderiv.: m.p. 210° (foaming).

Hopkins, *J. Biol. Chem.*, 1929, **84**, 269.

Eggleton, *Science Progress*, 1932, **27**, 32 (Review).

Pirie, Bernal, *Biochem. J.*, 1932, **26**, 75.

Mason, *J. Biol. Chem.*, 1931, **90**, 409.

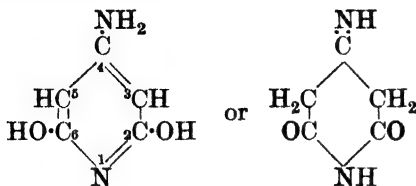
Nicolet, *J. Biol. Chem.*, 1930, **88**, 389.

Kendall, Mason, McKenzie, *ibid.*, 409.

Pirie, *Biochem. J.*, 1930, **24**, 51.

Meldrum, Dixon, *ibid.*, 472.

Glutazine (2 : 6-Dihydroxy-4-amino-pyridine, 2-iminoglutarimide)



$C_5H_6O_2N_2$

MW, 126

Rectangular plates from H_2O . M.p. 300° decomp. Spar. sol. cold H_2O : sol. reacts acid. Insol. EtOH, AcOH. Sol. alkalis, cold dil. min. acids. $FeCl_3$ on H_2O sol. \rightarrow deep red col. which on warming \rightarrow dark green. Heat + $HCl.Aq.$ $\rightarrow NH_4Cl$ + 2 : 4 : 6-trihydroxypyridine.

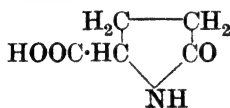
N-Acetyl: glistening plates from H_2O . M.p. $285-90^\circ$.

Niementowski, Sucharda, *J. prakt. Chem.*, 1916, **94**, 203.

Glutimic Acid.

See Glutiminic Acid.

Glutiminic Acid (Pyroglutamic acid, 2-pyrrolidone-5-carboxylic acid)



$C_5H_7O_3N$

MW, 129

d-.

Cryst. from H_2O . M.p. $182-3^\circ$. $[\alpha]_D + 10.7^\circ$ in H_2O .

Amide: $C_5H_8O_2N_2, 1H_2O$. MW, 146. M.p. 165° .

l-.

Cryst. from H_2O . M.p. $162-3^\circ$ (148°). $[\alpha]_D - 11.5^\circ$ in H_2O .

Et ester: $C_7H_{11}O_3N$. MW, 157. B.p. $161^\circ/3$ mm. $D_{17}^{25} 1.0075$. $[\alpha]_D - 8.6^\circ$ in H_2O .

Amide: m.p. 165° .

Anilide: plates from EtOH. M.p. 191° . Spar. sol. cold H_2O . $[\alpha]_D^{25} + 17.9^\circ$ in 80% EtOH.

dl-.

M.p. $178-9^\circ$.

Me ester: $C_6H_9O_3N$. MW, 143. B.p. $180^\circ/25$ mm.

Et ester: needles from Et_2O . M.p. 61° ($52-3^\circ$).

Amide: m.p. $220-1^\circ$ ($217-8^\circ$).

Hg salt: decomp. at $207-8^\circ$.

Bergmann, Zervas, *Z. physiol. Chem.*, 1933, **221**, 51.

Gray, *J. Chem. Soc.*, 1928, 1264.

Abderhalden, Schwab, *Z. physiol. Chem.*, 1926, **153**, 88.

Glutinic Acid (Allylene-1 : 3-dicarboxylic acid, propine-1 : 3-dicarboxylic acid)



$C_5H_4O_4$

MW, 128

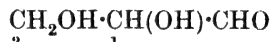
Fine needles from H_2O . M.p. $145-6^\circ$ decomp. Sol. H_2O , EtOH, Et_2O . Insol. $CHCl_3$, C_6H_6 .

Di-Me ester: $C_7H_8O_4$. MW, 156. B.p. $101^\circ/6$ mm. $D_4^{20} 1.1657$. $n_D^{20} 1.4878$. Pungent odour. Alkalis \rightarrow red col.

Burton, Pechmann, *Ber.*, 1887, **20**, 148.

Makulec, Malachowski, Mansitius, *Chem. Abstracts*, 1929, **23**, 2153.

Glyceraldehyde (1 : 2-Dihydroxypropionaldehyde)



$C_3H_6O_3$

MW, 90

The optically active forms of the free aldehyde polymerise much more readily than the inactive form.

d-.

Syrup. $[\alpha]_D + 13.5^\circ$.

Di-Me acetal: $C_5H_{12}O_4$. MW, 136. B.p. $124-7^\circ/14$ mm. $[\alpha]_D^{22} + 22.5^\circ$ in H_2O .

Dibenzoyl: $C_{17}H_{14}O_5$. MW, 298. M.p. 80° .

Bisulphite comp.: m.p. $130-1^\circ$ decomp.

Semicarbazone: m.p. 133° .

Brigl, Grüner, *Ber.*, 1933, **66**, 931.

l-.

Di-Me acetal: b.p. $126-9^\circ/18$ mm. $[\alpha]_D^{25} - 21^\circ$ in H_2O .

dl-.

Cryst. from EtOH- Et_2O . M.p. 142° (138.5°). Dimolecular. Sol. 3 parts in 100 parts H_2O at 18° . Insol. pentane, C_6H_6 . Hot dil. $H_2SO_4 \rightarrow$ methylglyoxal. Dil. $Ba(OH)_2 \rightarrow dl$ -fructose + *dl*-sorbitose.

2-Me ether: dimeride. $(C_4H_8O_3)_2$. MW, 208. Prisms. M.p. $120-1^\circ$.

Di-Et acetal: $C_7H_{16}O_4$. MW, 164. B.p. $120-1^\circ/8$ mm.

Mono-acetone deriv.: $C_6H_{10}O_3$. MW, 130. B.p. $30-5^\circ/1$ mm.

1 : 2-Diacetyl: $C_7H_{10}O_5$. MW, 174. B.p. $100-8^\circ/0.8$ mm. Dimeride: cryst. from EtOH. M.p. 154° .

2-Benzoyl: $C_{10}H_{10}O_4$. MW, 194. M.p. 106–10°. *Semicarbazone*: decomp. at 160°. *Oxime*: m.p. 117–18°.

Dibenzoyl: dimeride. $(C_{17}H_{14}O_5)_2$. MW, 596. Cryst. from toluene. M.p. 231°.

Di-p-nitrobenzoyl: dimeride. Cryst. from toluene. M.p. 247°.

Osazone: m.p. 132°.

p-Bromophenylosazone: m.p. 168°.

Neuberg, *Biochem. Z.*, 1932, **255**, 1.

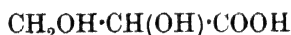
Fischer, Baer, *Ber.*, 1930, **63**, 1750.

Fischer, Tauber, Baer, *Ber.*, 1927, **60**, 479.

Reeves, *J. Chem. Soc.*, 1927, 2477.

Witzemann, *Organic Syntheses*, 1931, **XI**, 50.

Glyceric Acid (1:2-Dihydroxypropionic acid)



$C_3H_6O_4$ MW, 106

The free acid is a thick gum. Decomp. on dist. Misc. with H_2O , EtOH. Insol. Et_2O . The *d*- and *l*-forms in aq. sol. have dextro and lævo rotations, respectively, but their metallic salts in aq. sol. show reversed sign of rotation. Aq. sol. + $FeCl_3 \rightarrow$ intense yellow col. Esters and ether-esters of the *d*-acid are lævorotatory. Esters of the *l*-acid have not been recorded.

d-.

Me ester: $C_4H_8O_4$. MW, 120. B.p. 119–20°/14 mm. D_{15}^{15} 1.2798. $[\alpha]_D^{20} - 6.44^\circ (-4.8^\circ)$.

Di-Me ether Me ester: $C_6H_{12}O_4$. MW, 148. B.p. 77–8°/15 mm. D_4^{20} 1.0634. $[\alpha]_D^{20} - 69.7^\circ$.

Di-Me ether Et ester: $C_7H_{14}O_4$. MW, 162. B.p. 92°/17 mm. D_4^{20} 1.0309. $[\alpha]_D^{20} - 69.9^\circ$.

Et ester: diacetyl. $C_9H_{14}O_6$. MW, 218. B.p. 247–9°. D_{15}^{15} 1.1570. $[\alpha]_D^{15} - 16.31^\circ$.

Ba salt: $C_6H_{10}O_8Ba \cdot 2H_2O$. MW, 347. $[\alpha]_D^{20} - 9.8^\circ$ in H_2O .

Ca salt: $C_6H_{10}O_8Ca \cdot 2H_2O$. MW, 250. $[\alpha]_D^{20} - 14.6^\circ$ in H_2O .

Quinine salt: m.p. 187–8° (182°). $[\alpha]_D^{20} - 127^\circ$ in H_2O .

Brucine salt: m.p. 222°. $[\alpha]_D^{20} - 33^\circ$ in H_2O .

l-.

Ba salt: $[\alpha]_D^{20} + 9.9^\circ$ in H_2O .

Ca salt: $[\alpha]_D^{20} + 12.9^\circ$ in H_2O .

Quinine salt: m.p. 178–80° (165–7°). $[\alpha]_D^{20} - 116.2^\circ$ in H_2O .

Brucine salt: m.p. 222°. $[\alpha]_D^{20} - 22^\circ$ in H_2O .

dl-.

$k = 2.8 \times 10^{-4}$ at 25°. Ox. with MnO_2 or by electrolysis of Cu salt \rightarrow glycollic aldehyde. On long standing \rightarrow polymeric anhydride, needles from H_2O , decomp. at 250°.

Me ester: b.p. 119–20°/14 mm. D_{15}^{15} 1.2814. **Mono-acetone (isopropylidene) deriv.:** $C_7H_{12}O_4$. MW, 160. B.p. 84°/14 mm. D_4^{19} 1.1055. n_D^{20} 1.4230.

Et ester: $C_5H_{10}O_4$. MW, 134. B.p. 120–1°/14 mm. D_{15}^{15} 1.1909. **Mono-acetone (isopropylidene) deriv.:** $C_8H_{14}O_4$. MW, 174. B.p. 89°/11 mm. D_4^{20} 1.0754. n_D^{17} 1.4263.

Propyl ester: $C_6H_{12}O_4$. MW, 148. B.p. 126–7°/14 mm. D_{15}^{15} 1.1453.

Amide: $C_3H_7O_3N$. MW, 105. Prisms from MeOH. M.p. 92°. **Acetone (isopropylidene) deriv.:** $C_6H_{11}O_3N$. MW, 145. Cryst. from C_6H_6 . M.p. 111–12°.

2-Benzoyl: $C_{10}H_{10}O_5$. MW, 210. M.p. 141–2°.

Glattfeld, *Am. Chem. J.*, 1913, **50**, 151.

Nef, *Ann.*, 1914, **403**, 295.

Nef, Hedenburg, Glattfeld, *J. Am. Chem. Soc.*, 1917, **39**, 1643.

Frankland, Gebhard, *J. Chem. Soc.*, 1905, **87**, 864.

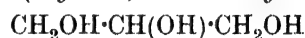
Glattfeld, Hanke, *J. Am. Chem. Soc.*, 1918, **40**, 987–9.

Ott, Krämer, *J. prakt. Chem.*, 1933, **137**, 255.

Glycerin.

See Glycerol.

Glycerol (*Glycerin*, 1:2:3-trihydroxypropane)



$C_3H_8O_3$ MW, 92

Colourless syrup. Solidifies at about 0° to rhombic cryst. M.p. 20°. B.p. 290° part. decomp., 210°/50 mm., 182°/20 mm., 179–80°/12 mm., 166°/9 mm. D_4^{18} 1.26414, D_{17}^{17} 1.2620, D_{15}^{15} 1.26468. Heat of comb. C.p. 4323 cal./gm. Very hygroscopic. Misc. in all proportions with H_2O and EtOH. Sol. 11 parts AcOEt, 500 parts Et_2O . Insol. $CHCl_3$, CS_2 , pet. ether, C_6H_6 . Volatile in steam. Mild ox. \rightarrow "glycerose" (glyceraldehyde + dihydroxyacetone). Forms metallic derivs. Its sulphuric esters are very hygroscopic and unstable.

1-Mononitrate: $C_3H_7O_6N$. MW, 137. Prisms from H_2O , EtOH, or Et_2O . M.p. 58–9°. B.p. 155–60°. Non-explosive.

2-Mononitrate: leaflets from H_2O . M.p. 54°. B.p. 155–60°. More sol. than the 1-deriv.

1:2-Dinitrate: $C_3H_6O_7N_2$. MW, 182. Oil. B.p. 146–8°/15 mm. slight decomp.

1:3-Dinitrate: $C_3H_6O_7N_2 \cdot \frac{1}{2}H_2O$. Prisms from H_2O . M.p. 26°.

Hepworth, *J. Chem. Soc.*, 1919, **115**, 842.

Trinitrate: see Nitroglycerin.

Monophosphate: see Glycerophosphoric Acid.

Formates : see Monoformin, Diformin, and Triformin.

Acetates : see Monoacetin, Diacetin, and Triacetin.

Butyrates : see Tributyrin, and under Butyric Acid.

*Isobutyrate*s : see Mono-isobutyrim, Di-isobutyrim and Tri-isobutyrim.

1-*Caproate* : α -monocaproin. $C_9H_{18}O_4$. MW, 190. B.p. $132-4^\circ/2$ mm.

Tricaproate : see under Caproic Acid.

1-*Caprylate* : α -monocaprylin. $C_{11}H_{22}O_4$. MW, 218. M.p. 40° .

Tricaprylate : see under Caprylic Acid.

1-*Caprate* : α -monocaprin. $C_{13}H_{26}O_4$. MW, 246. M.p. 54° .

Tricaprate : see under *n*-Capric Acid.

Monolaurate : see Monolaurin.

1 : 3-*Dilaurate* : $\alpha\alpha'$ -dilaurin. $C_{27}H_{52}O_5$. MW, 456. M.p. 57° .

Trilaurate : see Trilaurin.

Monomyristate : see Monomyristin.

1 : 3-*Dimyristate* : $\alpha\alpha'$ -dimyristin. $C_{31}H_{60}O_5$. MW, 512. M.p. 64° .

Trimyristate : see Trimyristin.

Palmitates : see Monopalmitin, Dipalmitin, and Tripalmitin.

Stearates : see Monostearin, Distearin, and Tristearin.

Oleates : see Mono-olein and Triolein.

1-*Benzoate* : $C_{10}H_{12}O_4$. MW, 196. M.p. 36° . B.p. 124° in high vacuum.

2-*Benzoate* : m.p. 72.5° .

1 : 2-*Dibenzoate* : $C_{17}H_{16}O_5$. MW, 300. M.p. 60° .

Tribenzoate : $C_{24}H_{20}O_6$. MW, 404. M.p. 76° (71°).

1-*p*-*Bromobenzoate* : m.p. 70° .

1-*p*-*Nitrobenzoate* : m.p. 107° .

2-*p*-*Nitrobenzoate* : m.p. $120-1^\circ$.

Other esters : see under the Acids.

Rewadikar, Watson, *J. Indian Inst. Sci.*, 1930, 13A, 128.

1-*Me ether* : 1 : 2-dihydroxy-3-methoxypropane. $C_4H_{10}O_3$. MW, 106. B.p. 220° , $136^\circ/40$ mm. D_4^{25} 1.111. n_D^{25} 1.442. *Di-p-nitrobenzoate* : m.p. 108° . *Diphenylcarbamate* : m.p. $118-19^\circ$.

2-*Me ether* : 1 : 3-dihydroxy-2-methoxypropane. B.p. 232° , $148^\circ/40$ mm. D_4^{25} 1.124. n_D^{25} 1.446. *Di-p-nitrobenzoate* : m.p. 155° . *Di-phenylcarbamate* : m.p. 102° .

1 : 2-*Di-Me ether* : 1-hydroxy-2 : 3-dimethoxypropane. $C_5H_{12}O_3$. MW, 120. B.p. 180° , $100^\circ/40$ mm. D_4^{25} 1.016. n_D^{25} 1.421.

1 : 3-*Di-Me ether* : 2-hydroxy-1 : 3-dimethoxypropane. B.p. 169° , $88^\circ/40$ mm. D_4^{25} 1.004. n_D^{25} 1.417.

Tri-Me ether : 1 : 2 : 3-trimethoxypropane. $C_6H_{14}O_3$. MW, 134. B.p. 148° . D_4^{25} 0.937. n_D^{25} 1.401.

1-*Et ether* : 1 : 2-dihydroxy-3-ethoxypropane. $C_5H_{12}O_3$. MW, 120. B.p. 222° , $118^\circ/21$ mm. D_4^{25} 1.063. n_D^{25} 1.441.

1 : 3-*Di-Et ether* : 2-hydroxy-1 : 3-diethoxypropane. $C_7H_{16}O_3$. MW, 148. B.p. 191° , $108-10^\circ/60$ mm. D_4^{25} 0.953. n_D^{25} 1.420.

Tri-Et ether : 1 : 2 : 3-triethoxypropane. $C_9H_{20}O_3$. MW, 176. B.p. 181° , $103-5^\circ/60$ mm. D_4^{25} 0.937. n_D^{25} 1.401.

1-*Propyl ether* : $C_6H_{14}O_3$. MW, 134. B.p. $118-22^\circ/15$ mm. D_4^{25} 1.074. n_D^{25} 1.440.

1 : 3-*Dipropyl ether* : $C_9H_{20}O_3$. MW, 176. B.p. $216-18^\circ$, $135-7^\circ/60$ mm. D_4^{25} 0.927. n_D^{25} 1.424.

1 : 3-*Di-isopropyl ether* : b.p. $198-9^\circ$, $123-4^\circ/60$ mm. D_4^{25} 0.914. n_D^{25} 1.418.

1-*n-Butyl ether* : $C_7H_{16}O_3$. MW, 148. B.p. $138-40^\circ/22$ mm. D_4^{25} 1.002. n_D^{25} 1.4463.

1-*Isoamyl ether* : $C_8H_{18}O_3$. MW, 162. B.p. 254° , $136-8^\circ/10$ mm. D_4^{25} 0.976. n_D^{25} 1.440.

1-*Cetyl ether* : see Chimyl Alcohol.

1-*Octadecyl ether* : see Batyl Alcohol.

1-*Octadecenyl ether* : see Selachyl Alcohol.

1-*Phenyl ether* : 1 : 2-dihydroxy-3-phenoxypropane. $C_9H_{12}O_3$. MW, 168. M.p. $67-8^\circ$ ($53-4^\circ$). B.p. $145-8^\circ/0.6$ mm.

1 : 3-*Diphenyl ether* : 2-hydroxy-1 : 3-diphenoxypropane. $C_{15}H_{16}O_3$. MW, 244. M.p. $80-1^\circ$.

1-*o-Tolyl ether* : $C_{10}H_{14}O_3$. MW, 182. M.p. 67° . B.p. $195-6^\circ/16$ mm.

1-*m-Tolyl ether* : m.p. 60° ($65-70^\circ$). B.p. $199^\circ/16$ mm.

1-*p-Tolyl ether* : m.p. 73° .

1 : 3-*Di-o-tolyl ether* : $C_{17}H_{20}O_3$. MW, 272. B.p. $196^\circ/2$ mm.

1 : 3-*Di-m-tolyl ether* : b.p. $205^\circ/2$ mm.

1 : 3-*Di-p-tolyl ether* : m.p. 88° .

1-*Benzyloxy ether* : $C_{10}H_{14}O_3$. MW, 182. B.p. $164-6^\circ/2$ mm. D_4^{25} 1.130. n_D^{25} 1.530.

1 : 3-*Dibenzyloxy ether* : $C_{17}H_{20}O_3$. MW, 272. B.p. $198-204^\circ/2$ mm. D_4^{25} 1.100. n_D^{25} 1.547.

Methylene ether : see Methylene glycerol.

Ethylidene ether : see Ethylideneglycerol.

Isopropylidene ether, acetone deriv., acetone-glycerol : see Isopropylideneglycerol.

Benzylidene ether : see Benzylideneglycerol.

Addendum, Vol. I.

Fairbourn, *J. Chem. Soc.*, 1932, 1965, 1972; 1931, 445; 1930, 369; *Chemistry and Industry*, 1930, 49, 1021.

α -Monobromohydrin: 3-bromopropylene glycol. $C_3H_7O_2Br$. MW, 155. B.p. $134^\circ/16$ mm.

β -Monobromohydrin: 2-bromotrimethylene glycol. B.p. $106^\circ/6$ mm. D_4^{18} 1.7709. n_D^{18} 1.5228.

Dibromohydrin: see 2:3-Dibromopropyl Alcohol and sym.-Dibromoisopropyl Alcohol.

Monochlorohydrin: see 3-Chloropropylene Glycol and 2-Chlorotrimethylene Glycol.

Dichlorohydrin: see 2:3-Dichloropropyl Alcohol and sym.-Dichloroisopropyl Alcohol.

α -Monoiodohydrin: 3-iodopropylene glycol. $C_3H_7O_2I$. MW, 202. M.p. 49° . Di-p-nitrobenzoyl: m.p. 102° .

β -Monoiodohydrin: 2-iodotrimethylene glycol. M.p. $52-3^\circ$.

Di-iodohydrin: see 2:3-Di-iodopropyl Alcohol and sym.-Di-iodoisopropyl Alcohol.

Glattfeld, Klaas, *J. Am. Chem. Soc.*, 1933, **55**, 1115.

Smith, Laudon, *Ber.*, 1933, **66**, 899.

Fairbourne, Stephens, *J. Chem. Soc.*, 1932, 1975.

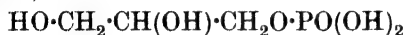
Carré, *Bull. soc. chim.*, 1910, **7**, 835.

Glycerophosphoric Acid (*Glycerol mono-phosphate*)

$C_3H_9O_6P$ MW, 172

Exists in several isomeric forms. The free acid in every case is a syrup. Decomp. on dist. Slowly hyd. by H_2O .

α -Glycerophosphoric acid (*glycerol-1-mono-phosphate*)



d.-

Di-Me ether di-Me ester: $C_7H_{17}O_6P$. MW, 228. $[\alpha]_D + 5.1^\circ$.

Li salt: $Li_2C_3H_7O_6P$. MW, 184. $[\alpha]_D^{18} + 3.51^\circ$ in H_2O .

l.-

Di-Me ether Na salt: $Na_2C_6H_{11}O_6P$. MW, 244. $[\alpha]_D - 7.2^\circ$.

Li salt: $[\alpha]_D^{18} - 3.02^\circ$ in H_2O .

dl.-

Ca salt: $CaC_3H_7O_6P$. MW, 210. Sol. 2.6 parts in 100 parts H_2O at 18° . A second modification is sol. 1.8 in 100 parts H_2O at 18° .

Ba salt: $BaC_3H_7O_6P$, $0.25H_2O$. MW, 307 (anhyd.). Sol. 1.87 in 100 parts H_2O at 16° .

Quinine salt: m.p. 155° .

β -Glycerophosphoric acid (*glycerol-2-mono-phosphate*)



Ba salt: $BaC_3H_7O_6P\cdot 1H_2O$. MW, 325. Sol. 5.25 parts in 100 parts H_2O at 21° . Other (unstable) forms of this salt exist.

"Natural glycerophosphoric acid" obtained from animal and vegetable phosphatides is a mixture of about 3 parts β - and 1 part of the optically active α -comp. and has $[\alpha]_D$ about -0.5° .

"Synthetic glycerophosphoric acid" made by interaction of glycerol and phosphoric acid, anhydride, or salts, is also a mixture of the α - and β -comps. but not identical with fully racemized "natural glycerophosphoric acid." D^{14} 1.59. Becomes glassy and pulverisable at -20° . Ba salt: $BaC_3H_7O_6P\cdot \frac{1}{2}H_2O$. Sol. 1 in 53.7 H_2O at 17° . Ca salt: $CaC_3H_7O_6P$. Sol. 1 in 22.4 H_2O at 16° .

Fleury, Paris, *Compt. rend.*, 1933, **196**, 1416.

Charpentier, Bocquet, *Compt. rend.*, 1932, **194**, 104.

Frisch, Waldmann, Austrian P., 12,8071, (*Chem. Abstracts*, 1932, **26**, 4422).

Karrer, Saloman, *J. Biol. Chem.*, 1931, **93**, 407, 409.

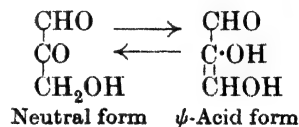
Hill, Pyman, *J. Chem. Soc.*, 1929, 2236.

Abderhalden, Eichwald, *Ber.*, 1918, **51**, 1308.

Glycerose.

See under Glycerol.

Glycerosone (*Glycollylformaldehyde*, 2-hydroxy-1-ketopropionaldehyde, glyoxylylcarbinol, hydroxymethylglyoxal, hydroxypyruvic aldehyde)



$C_3H_4O_3$

MW, 88

Produced as polymer during photochemical decomposition of glyoxal vapour under mercury-vapour lamp illumination. Sol. $H_2O \longrightarrow$ acid sol. which reduces Fehling's in the cold. H_2O sol. adds Br_2 instantly. Forms yellow Na salt.

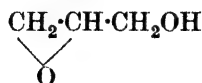
Dioxime: m.p. 168° decomp.

Tri-phenylhydrazone: two modifications. (a) Formed in the cold. Yellow cryst. from EtOH.Aq. M.p. 161° . (b) Formed hot. Reddish cryst. from EtOH.Aq. M.p. 132° .

Quinoxaline deriv.: yellow cryst. from EtOH.Aq. M.p. 165° .

Norrish, Griffiths, *J. Chem. Soc.*, 1928, 2829.

Glycide (*Glycidol, epihydrin-alcohol, 3-hydroxypropylene oxide, hydroxymethyl-ethylene oxide*)

C₃H₆O₂

MW, 74

B.p. 166–7° decomp., 65–6°/2.5 mm., 41°/1 mm. D_{25}^{25} 1.1143. n_D^{25} 1.4302. Sol. H₂O, EtOH, Et₂O, Me₂CO, CHCl₃, C₆H₆. Spar. sol. pet. ether, xylene. H₂O → glycerol. Polymerises on boiling Py sol. Does not reduce Fehling's or NH₃·AgNO₃.

Acetyl: b.p. 168–9°. D_4^{20} 1.124.

Me ether: methoxypropylene oxide.

C₄H₈O₂. MW, 88. B.p. 115–18°. Sol. H₂O.

Et ether: ethoxypropylene oxide. C₅H₁₀O₂. MW, 102. B.p. 124–6° (128°). D_4^{25} 0.94. n_D^{25} 1.406. Sol. cold H₂O.

Phenyl ether: phenoxypropylene oxide. C₉H₁₀O₂. MW, 150. B.p. 243–4°, 133°/23 mm., 115–16°/3–4 mm. D_4^{25} 1.10. n_D^{25} 1.53.

Phenylurethane: m.p. 60°.

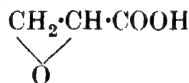
1-Naphthylurethane: m.p. 102°.

Mono-nitrate: "nitroglycide." B.p. 174° part decomp., 62–4°/15 mm. D^{20} 1.332. Insol. H₂O.

Rider, Hill, *J. Am. Chem. Soc.*, 1930, **52**, 1521.

Bigot, *Ann. chim. phys.*, 1891, **22**, 482.

Glycidic Acid (*Ethylene oxide carboxylic acid, acrylic acid oxide*)

C₃H₄O₃

MW, 88

Liq. misc. in all proportions with H₂O, EtOH, Et₂O. Vapour is lachrymatory. The free acid and its salts on warming with H₂O → glyceric acid or its salts.

d-.
K salt: $[\alpha]_D^{18} + 30.16^\circ$ in H₂O.

l-.
K salt: $[\alpha]_D^{18} - 11.7^\circ$ in H₂O.

dl-.
Et ester: C₅H₈O₃. MW, 116. B.p. 161–3°.

Immiscible with H₂O. D_4^{25} 1.0933.

Abderhalden, Eichwald, *Ber.*, 1915, **48**, 116.

Freudenberg, *Ber.*, 1914, **47**, 2034.

Glycidol.

See Glycide.

Glycine (*Aminoacetic acid, glycoll*)

C₂H₅O₂N

MW, 75

Prisms. M.p. 262° decomp. (turns brown at 228°). Sol. 2 parts H₂O at 20–25°, 930 parts EtOH, 164 parts Py. Insol. Et₂O. Triboluminescent. Heat of comb. C_p 3110 cal./gm. k (acid) = 1.15×10^{-10} at 25°; k (base) = 1.7×10^{-12} at 25°. Isoelectric point, $[H^+]$ about 10^{-6} . Sweet taste.

The acid and its salts combine with many metallic salts to give double salts.

B, HCl: m.p. 185°.

N-Acetyl: see Acetyl glycine.

N-Benzoyl: see Hippuric Acid.

Me ester: C₃H₇O₂N. MW, 89. B.p. about 130° decomp., 54°/50 mm. Absorbs CO₂. *B, HCl*: m.p. 175°. Sol. EtOH.

Et ester: C₄H₉O₂N. MW, 103. B.p. 148–9°/750 mm. slight decomp., 65°/40 mm., 51–2°/10 mm. D_4^{20} 1.0275. n_D^{20} 1.42417. Misc. with H₂O, EtOH, Et₂O, C₆H₆, ligroin. *B, HCl*: needles. M.p. 144°. Sublimes. Very sol. H₂O, EtOH. *Picrate*: m.p. 157°.

Allyl ester: C₅H₉O₂N. MW, 115. *B, HCl*: m.p. 170–80°.

Amide: see Aminoacetamide.

Nitrile: see Aminoacetonitrile.

Anhydride: see 2 : 5-Diketopiperazine.

Hydrazide: aminoacethydrazide. NH₂·CH₂·CO·NH·NH₂. C₂H₇ON₃. MW, 89. Hygroscopic cryst. M.p. 80–5°. Decomp. at 150°. Sol. CHCl₃. Spar. sol. EtOH. Insol. Et₂O. Absorbs CO₂. Reduces Fehling's. *Hydrochloride*: needles. M.p. 200–1°.

Anilide: needles + 2H₂O from H₂O. M.p. 62°. Sol. H₂O, EtOH. Spar. sol. Et₂O, C₆H₆.

o-Toluidide: needles from H₂O. M.p. 66°.

m-Toluidide: cryst. from H₂O. M.p. 74°.

p-Toluidide: m.p. anhyd. 107°.

Picrate: m.p. 190°.

N-Me: see Sarcosine.

N-Di-Me: see Dimethylglycine.

N-Et: see Ethylglycine.

N-Di-Et: see Diethylglycine.

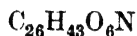
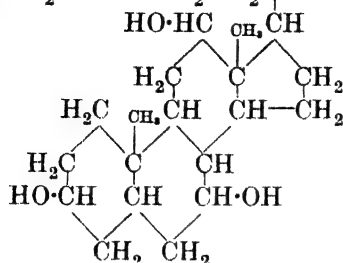
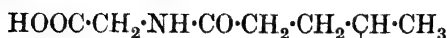
N-Phenyl: see Phenylglycine.

Contardi, Ravazzoni, *Chem. Zentr.*, 1934, I, 1186.

Kulikov, Slastenina, *Chem. Abstracts*, 1933, **27**, 2675.

Anslow, King, *Organic Syntheses*, 1932, COLLECTIVE VOL. I, 292; *J. Chem. Soc.*, 1929, 2463.

Fischer, *Ber.*, 1906, **39**, 548.

Glycine Aldehyde.Aminoacetaldehyde, *q.v.***Glycocholic Acid** (*Cholylglycine*)

MW, 465

Constituent of bile. M.p. $154-5^\circ$ (144°) decomp. $[\alpha]_D^{25} + 24.3^\circ$ in H_2O , $+27.8^\circ$ in 90% EtOH. Forms add. comps. with nitrobenzene, aniline, benzaldehyde, etc. Hyd. \rightarrow glycine + cholic acid.

Tetra-acetyl: m.p. 145° . *Chloride*: m.p. 164° .

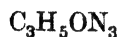
Tres-Chemisch-Pharmazeutische Industrie, D.R.P., 574,654, (*Chem. Zentr.*, 1933, I, 1550).

Minovici, Vanghelovici, *Chem. Zentr.*, 1932, I, 397.

Letsche, *Z. physiol. Chem.*, 1909, 60, 462.

Glycocoll.

See Glycine.

Glycocyamidine (*Glycollylguanidine*, 4-keto-2-iminotetrahydroglyoxaline)

MW, 99

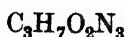
Free base very sol. cold H_2O . Turns brown at about 240° and chars gradually up to 300° .

B.HCl: m.p. 213° .

Picrate: needles or plates from H_2O . M.p. $214-15^\circ$ decomp.

Me deriv.: Creatinine, *q.v.*

King, *J. Chem. Soc.*, 1930, 2374.

Glycocyamidine (*Guanidinoacetic acid*, *N-guanylglycine*)

MW, 117

Plates from boiling H_2O . M.p. above 300° ($250-60^\circ$).

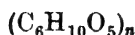
B.HCl: plates from conc. HCl. M.p. 200° decomp.

Picrate: needles from boiling H_2O . M.p. 210° decomp.

"*Half-picrate*": plates from boiling H_2O . M.p. 242° decomp.

Me deriv.: see Creatine.

See previous reference.

Glycogen ("Animal starch")

Polysaccharide occurring in livers of animals. White powder. Sol. cold H_2O to slightly opalescent sol. $[\alpha]_D^{25} + 191.4^\circ$ in H_2O . $\text{I} \rightarrow$ red col. Does not reduce Fehling's. Hyd. by dil. acids \rightarrow glucose only.

"*Triacetate*": decomp. at 177° . Sol. CHCl_3 , Me_2CO . Insol. H_2O , MeOH , EtOH . $[\alpha]_D^{25} + 170^\circ$ in CHCl_3 .

"*Tri-Me deriv.*": m.p. 147° (softens at 135°). $[\alpha]_D^{25} + 209^\circ$ in CHCl_3 .

Haworth, Percival, *J. Chem. Soc.*, 1932, 2277.

Mizutani, F.P., 720,268, (*Chem. Abstracts*, 1932, 26, 3870).

Glycol.

See Ethylene Glycol.

Glycoline.

See 2:5-Dimethylpyrazine.

Glycollic Acid (*Hydroxyacetic acid*)

MW, 76

Constituent of cane-sugar juice. Needles from H_2O , leaflets from Et_2O . M.p. 80° . Sol. H_2O , EtOH , Et_2O . Heat of comb. C_p 167 Cal. $k = 1.5 \times 10^{-4}$ at 25° . Prolonged heat. at $100^\circ \rightarrow$ glycollic anhydride. Dist. in vacuum \rightarrow glycollide + polyglycollide. $\text{H}_2\text{O}_2(+\text{Fe}^{++}) \rightarrow$ glyoxylic acid.

Ammonium salt: m.p. 102° . B.p. $160^\circ/10$ mm. Distils undecomp. in vacuo. Hygroscopic.

Acetyl: see Acetoxyacetic Acid.

Benzoyl: m.p. 112° . *Anhydride*: m.p. 126° .

Carbomethoxyl: $\text{CH}_3\text{O} \cdot \text{CO} \cdot \text{OCH}_2 \cdot \text{COOH}$. Micro-plates from Et_2O or C_6H_6 . M.p. $33-4^\circ$. B.p. $112^\circ/0.6$ mm.

Me ester: $\text{C}_3\text{H}_6\text{O}_3$. MW, 90. B.p. 151° . D_4^{25} 1.1677. *Phenylurethane*: m.p. 74° .

Et ester: $\text{C}_4\text{H}_8\text{O}_3$. MW, 104. B.p. 160° . D_4^{25} 1.0869.

Anhydride: m.p. $128-30^\circ$. Insol. EtOH, Et_2O . *Diacetate*: b.p. $178-80^\circ/20$ mm.

Amide: hydroxyacetamide. $\text{C}_2\text{H}_5\text{O}_2\text{N}$. MW, 75. Leaflets from EtOH. M.p. $116-17^\circ$.

Nitrile: hydroxyacetonitrile, formaldehyde cyanhydrin. $\text{C}_2\text{H}_3\text{ON}$. MW, 57. B.p. 183°

slight decomp., 98°/10 mm. *Benzoyl*: m.p. 195–6°.

Phenylurethane: m.p. 141° decomp.

Hydrazide: hydroxyacethydrazide. $\text{HO}\cdot\text{CH}_2\cdot\text{CO}\cdot\text{NH}\cdot\text{NH}_2$. M.p. 93°. *B.HCl*: m.p. 155°.

Me ether: see Methoxyacetic Acid.

Et ether: see Ethoxyacetic Acid.

Butyl ether: $\text{C}_6\text{H}_{12}\text{O}_3$. MW, 132. B.p. 113–16°/10 mm.

Isobutyl ether: b.p. 114°/9 mm.

Phenyl ether: see Phenoxycetic Acid.

Société Franco-Belge d'Ougré, F.P., 735,050, (*Chem. Abstracts*, 1933, 27, 914).

Brigl, Grüner, *Ber.*, 1932, 65, 642.

Palomaa, *Chem. Zentr.*, 1913, II, 1959.

Kopetschni, Karczag, D.R.P., 262,883, (*Chem. Zentr.*, 1913, II, 728).

Polstorff, Meyer, *Ber.*, 1912, 45, 1910.

Glycollic Aldehyde (*Hydroxyacetaldehyde*)



$\text{C}_2\text{H}_4\text{O}_2$ MW, 60

Plates. M.p. 96–7°. Sol. H_2O , hot EtOH. Spar. sol. Et_2O . Fresh H_2O sols. contain bimolecular form of the aldehyde which becomes monomolecular after 24 hours. Reduces Fehling's in the cold. 1% NaOH.Aq. at 0° (on standing) \rightarrow hexose mixture. Conc. alkalis \rightarrow yellow col.

Mono-acetyl: bimolecular form. M.p. 157–8°.

Triacetyl: cryst. from Et_2O -pet. ether. M.p. 52°.

Benzoyl: m.p. 32–4°. B.p. 124–6°/9 mm. *Oxime*: m.p. 78–81°. *Semicarbazone*: m.p. 194–5°.

Carbomethoxyl: $\text{CH}_3\text{O}\cdot\text{CO}\cdot\text{OCH}_2\cdot\text{CHO}$. B.p. 78–9°/17 mm.

Di-Me acetal: $\text{C}_4\text{H}_{10}\text{O}_3$. MW, 106. B.p. 158–9°/749 mm.

Di-Et acetal: $\text{C}_6\text{H}_{14}\text{O}_3$. MW, 134. B.p. 167°, 57–8°/8 mm. D^{24}_D 0.888.

Et ether: $\text{C}_4\text{H}_8\text{O}_3$. MW, 88. (a) Aldehydic form. B.p. 71–3°. Reduces $\text{NH}_3\cdot\text{AgNO}_3$ in cold. (b) Deriv. of cyclic form of glycollic aldehyde ("glycolose"). Bimolecular. M.p. 59–60°. B.p. 84–5°/9 mm. Sol. ord. org. solvents. Spar. sol. cold H_2O , pet. ether. Reduces hot $\text{NH}_3\cdot\text{AgNO}_3$. Does not reduce Fehling's.

Phenylhydrazone: cryst. M.p. about 162°. Sol. H_2O , EtOH, Et_2O .

Phenylosazone: glyoxal phenylosazone. Yellow plates from Et_2O . M.p. 179–80°. Sol. CHCl_3 , C_6H_6 , hot EtOH. Insol. H_2O , ligroin.

p-Nitrophenylosazone: glyoxal-*p*-nitrophenylosazone. M.p. 311°.

Hartung, *J. Am. Chem. Soc.*, 1927, 49, 2520.

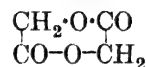
Fischer, Taube, *Ber.*, 1927, 60, 1707.

Aoyama, *Journal of the Pharmaceutical Society of Japan*, 1927, 539, 27.

Bergmann, Miekeley, *Ber.*, 1921, 54, 2150.

v. Pechmann, *Ber.*, 1897, 30, 2460.

Glycollide (*Glycollodilactone*)



$\text{C}_4\text{H}_4\text{O}_4$

MW, 116

Cryst. from EtOH. M.p. 84°.

Johansson, Sebelius, *Ber.*, 1919, 52, 745.

Glycollylformaldehyde.

See Glycerosone.

Glycollylguanidine.

See Glycocyamidine.

p-Glycollylphenol.

See *p*-Hydroxyphenacyl Alcohol.

Glycollylurea.

See Hydantoin.

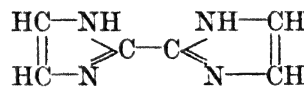
Glycolose.

See under Glycollic Aldehyde.

Glycoluric Acid.

See Hydantoic Acid.

Glycosine (2 : 2'-Di-iminazole)



$\text{C}_6\text{H}_6\text{N}_4$

MW, 134

Prisms from AcOH or boiling H_2O . Very spar. sol. ord. org. solvents. Insol. cold H_2O . Di-acidic base or weak acid according to conditions. Br.Aq. on aq. sols. \rightarrow green ppt. Na alcoholates \rightarrow violet-red col. Nitration \rightarrow mixture of mono-, di-, tri-, and tetra-nitro derivs. Alkali salts mod. sol. H_2O and cryst. in reddish-brown needles which explode on heating. Alkaline sol. couples with diazonium salts.

Dinitro deriv.: yellow hexagonal leaflets. M.p. 283° decomp.

Trinitro deriv.: light brown leaflets. Decomp. above 300°.

Tetranitro deriv.: yellow prisms. M.p. 276° decomp. Explosive.

Tetra-azobenzene deriv.: dark red needles + $8\text{H}_2\text{O}$. M.p. 230–2°.

Picrate: needles from H_2O . M.p. above 270°.

Polyiodides: $\text{C}_6\text{H}_6\text{N}_4\cdot\text{HI}\cdot\text{I}_2$. M.p. 194–5°.

$C_6H_6N_4 \cdot 2HI_3$. M.p. 204–6°. $C_6H_8N_4I_8$. M.p. 185–6°.

Lehmstedt, *Ann.*, 1927, **456**, 253.

Glycurone.

See Glucurone.

Glycuronic Acid.

See Glucuronic Acid.

Glycyl-alanine



$C_5H_{10}O_3N_2$ MW, 146

d-.

Needles or plates from EtOH.Aq. M.p. 235–6° decomp. (brown at 218°). Very sol. H_2O . Insol. ord. org. solvents. $[\alpha]_D^{20} - 50^\circ$ (42°) in H_2O .

Me ester hydrochloride: $C_6H_{13}O_3N_2Cl$. MW, 196.5. M.p. 160–2°.

Anhydride: see 3-Methyl-2 : 5-diketopiperazine.

NH₄Cl double salt: $[\alpha]_D^{20} - 9.4^\circ$.

dl-.

M.p. 227° decomp. Very sol. H_2O . Very spar. sol. EtOH. k (acid) = 4.4×10^{-9} at 20°; k (base) = 7.6×10^{-12} at 20°.

Et ester: *picrate*, m.p. 97–8°. *p-Toluenesulphonyl*, m.p. 68°.

Anhydride: see 3-Methyl-2 : 5-diketopiperazine.

Carbethoxyl: needles from H_2O . M.p. 188°.

Et ester, needles from Et_2O . M.p. 66° (sinters at 62°).

p-Toluenesulphonyl: m.p. 167°.

Levene, Steiger, Rothen, *J. Biol. Chem.*, 1932, **97**, 717.

Abderhalden, *Fermentforschung*, 1931, **12**, 376; 1928, **9**, 446, (*Chem. Abstracts*, 1931, **25**, 2741; 1928, **22**, 2550).

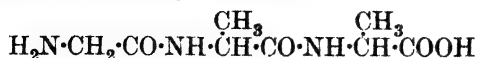
Bergmann, Grafe, *Z. physiol. Chem.*, 1930, **187**, 195.

Schönheimer, *Z. physiol. Chem.*, 1926, **154**, 211.

Fischer, *Ber.*, 1908, **41**, 2867.

Fischer, Schulze, *Ber.*, 1907, **40**, 943.

Glycyl-dl-alanyl-dl-alanine

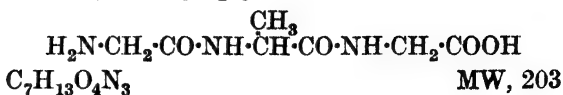


$C_8H_{15}O_4N_3$ MW, 217

Pearly leaflets from EtOH.Aq. M.p. 204–5° decomp. Hygroscopic.

Schlack, Kumpf, *Z. physiol. Chem.*, 1926, **154**, 140, 162.

Glycyl-alanyl-glycine



d-.

Needles from H_2O or EtOH.Aq. M.p. 245° (darkens at 220°) (rapid heat.). Very easily sol. dil. acids or alkalis. Insol. ord. org. solvents. $[\alpha]_D^{20} - 64.3^\circ$ in H_2O . Alkalis + $CuSO_4 \rightarrow$ bluish-violet col.

l-.

Chloroacetyl deriv.: m.p. 130° decomp. $[\alpha]_D^{20} + 48.3^\circ$.

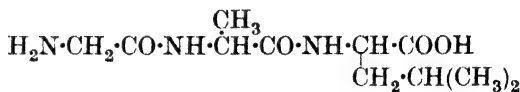
dl-.

M.p. 243°.

Levene, Pfaltz, *J. Biol. Chem.*, 1926, **68**, 277.

Fischer, *Ber.*, 1908, **41**, 853.

Glycyl-d-alanyl-l-leucine



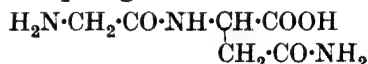
$C_{11}H_{21}O_4N_3$ MW, 259

Needles from H_2O . M.p. 239–40° decomp. $[\alpha]_D^{20} - 90^\circ$ in H_2O . Sol. hot H_2O . Mod. sol. cold H_2O . Insol. EtOH. Reacts weakly acidic.

Abderhalden, Fodor, *Z. physiol. Chem.*, 1912, **81**, 15.

Fischer, Brunner, *Ann.*, 1905, **340**, 150.

Glycyl-l-asparagine



$C_6H_{11}O_4N_3$ MW, 189

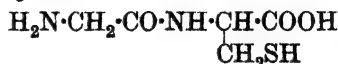
Needles from EtOH.Aq. M.p. 216° decomp. Very sol. H_2O . Very spar. sol. EtOH. $[\alpha]_D^{20} - 6.4^\circ$ in H_2O . Reacts weakly acidic. Alkalis + $CuSO_4 \rightarrow$ reddish-violet col.

Anhydride: m.p. 274° decomp. (brown at 245°).

Miyanoki, *J. Biochem. Japan*, 1931, **13**, 389.

Fischer, Koenigs, *Ber.*, 1904, **37**, 4587.

Glycylcysteine



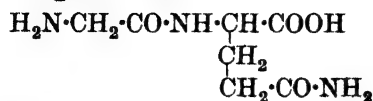
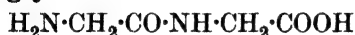
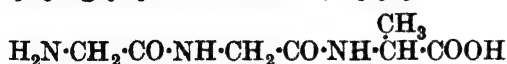
$C_5H_{10}O_3N_2S$ MW, 178

Cryst. from H_2O . M.p. 177° decomp. (sinters at 130°).

Pirie, *Biochem. J.*, 1931, **25**, 616.

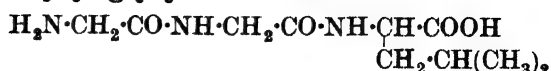
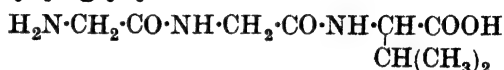
Glycyl-diglycyl-glycine.

See Triglycylglycine.

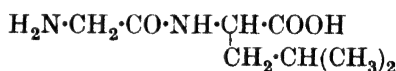
Glycyl-*d*-glutamine $\text{C}_7\text{H}_{13}\text{O}_4\text{N}_3$ MW, 203Cryst. + $1\text{H}_2\text{O}$ from $\text{MeOH}\cdot\text{Aq.}$ Decomp. at $199\text{--}200^\circ$ (anhyd.). $[\alpha]_D^{25} - 2.47^\circ$ in H_2O . Reacts acid to litmus.Thierfelder, Cramm, *Z. physiol. Chem.*, 1919, 105, 64.**Glycylglycine** $\text{C}_4\text{H}_8\text{O}_3\text{N}_2$ MW, 132Leaflets from $\text{EtOH}\cdot\text{Aq.}$ Decomp. at $260\text{--}2^\circ$ ($215\text{--}20^\circ$, $235\text{--}6^\circ$). Sol. hot H_2O . Very spar. sol. EtOH . Insol. Et_2O . Heat of comb. C_v 472.4 Cal. k (acid) = 5.6×10^9 at 20° ; k (base) = 7.6×10^{12} at 20° .Acetyl deriv.: plates from EtOH . M.p. $187\text{--}9^\circ$.Bromoacetyl deriv.: m.p. $174\text{--}5^\circ$.Chloroacetyl deriv.: prisms from H_2O . M.p. $178\text{--}80^\circ$. Et ester: m.p. $153\text{--}4^\circ$.Benzoyl deriv.: m.p. 208° .Et ester: $\text{C}_6\text{H}_{12}\text{O}_3\text{N}_2$. MW, 160. Needles from CHCl_3 -pet. ether. M.p. $88\text{--}9^\circ$. Hydrochloride: m.p. 182° decomp. Carbethoxyl: m.p. 87° . Acetyl: m.p. 152° .2-Naphthalenesulphonate: $\text{B}, \text{C}_{10}\text{H}_7\text{SO}_3\text{H}$. M.p. 193° .p-Toluenesulphonyl: $\text{C}_{11}\text{H}_{14}\text{O}_5\text{N}_2\text{S}$. MW, 286. Needles from H_2O . M.p. 178° . $\text{B}_2\text{H}_2\text{PtCl}_6$: orange-red cryst. + $2\text{H}_2\text{O}$. Decomp. at 120° (anhyd.).Fischer, Fourneau, *Ber.*, 1901, 34, 2868.Dunn, Butler, Deakers, *J. Biol. Chem.*, 1932, 99, 217 (*Bibl.*).Dernby, *Biochem. Z.*, 1917, 81, 166.**Glycyl-glycyl-*dl*-alanine (Diglycylalanine)** $\text{C}_7\text{H}_{13}\text{O}_4\text{N}_3$ MW, 203Turns brown at 215° .Fischer, *Ber.*, 1903, 36, 2987.Abderhalden, Ehrenwall, *Fermentforschung*, 1931, 12, 376, (*Chem. Abstracts*, 1931, 25, 2741).**Glycyl-glycyl-glycine.**

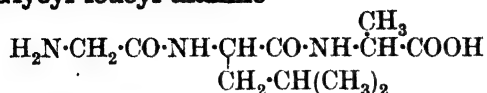
See Diglycylglycine.

Dict. of Org. Comp.—II.

Glycyl-glycyl-*dl*-leucine $\text{C}_{10}\text{H}_{19}\text{O}_4\text{N}_3$ MW, 245Hard cryst. M.p. 240° decomp. Gives soluble Cu salt.Chloroacetyl deriv.: m.p. $176\text{--}7^\circ$ decomp.Fischer, *Ber.*, 1903, 36, 2990.Abderhalden, Zeisset, *Fermentforschung*, 1929, 10, 554, (*Chem. Abstracts*, 1929, 23, 4232).**Glycyl-glycyl-*dl*-valine** $\text{C}_9\text{H}_{17}\text{O}_4\text{N}_3$ MW, 231M.p. $219\text{--}21^\circ$ decomp.Chloroacetyl deriv.: m.p. $169\text{--}71^\circ$ decomp.

See last reference above.

Glycyl-leucine $\text{C}_8\text{H}_{16}\text{O}_3\text{N}_2$ MW, 188*d*-.Cryst. from H_2O . $[\alpha]_D^{20} + 37.6^\circ$ in H_2O .*l*-.Plates from $\text{EtOH}\cdot\text{Aq.}$ M.p. 256° decomp. (245°) (yellow at 246°). $[\alpha]_D^{20} - 35.2^\circ$ in H_2O ; -35° in 10% HCl.Et ester: hydrochloride, m.p. $161\text{--}2^\circ$.Anhydride: m.p. $254\text{--}5^\circ$. $[\alpha]_D^{20} + 31^\circ$ in H_2O .Carbonyl deriv.: $\text{CO}(\text{C}_8\text{H}_{15}\text{O}_3\text{N}_2)_2$. M.p. 135° .*dl*-.Tetragonal cryst. from $\text{EtOH}\cdot\text{Aq.}$ M.p. 242° decomp. Sol. H_2O . Insol. EtOH .Carbethoxyl: plates from Me_2CO , needles from $\text{EtOH}\cdot\text{Aq.}$ M.p. 136° .Amide: $\text{C}_8\text{H}_{17}\text{O}_3\text{N}_3$. MW, 187. Hydrochloride, m.p. $211\text{--}12^\circ$.Anhydride: m.p. 245° .p-Toluenesulphonyl: m.p. $81\text{--}2^\circ$. Et ester, m.p. $83\text{--}5^\circ$.2-Naphthalenesulphonyl: m.p. 123° . $\text{C}_6\text{H}_5\cdot\text{NCO}$ deriv.: m.p. 177° .Levene, Steiger, Rothen, *J. Biol. Chem.*, 1932, 97, 717.Abderhalden, *Z. physiol. Chem.*, 1927, 168, 201; 1926, 160, 256.Fischer, Warburg, *Ann.*, 1905, 340, 157.

Glycyl-leucyl-alanine

$\text{C}_{11}\text{H}_{21}\text{O}_4\text{N}_3$ MW, 259

Glycyl-l-leucyl-d-alanine.

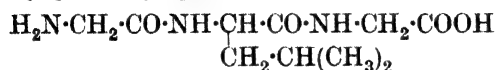
Needles from H_2O . M.p. 235–6° decomp.
 $[\alpha]_D^{20} - 59^\circ$ in H_2O . Very vol. H_2O . Insol. EtOH.

Inactive.

Tetragonal plates from H_2O . M.p. 250° decomp. Sol. H_2O . Alkali + $\text{CuSO}_4 \rightarrow$ red-dish-violet col.

Abderhalden, Fodor, *Z. physiol. Chem.*, 1912, **81**, 20.

Fischer, Warburg, *Ann.*, 1905, **340**, 164.

Glycyl-leucyl-glycine

$\text{C}_{10}\text{H}_{19}\text{O}_4\text{N}_3$ MW, 245

d.

M.p. 215°. $[\alpha]_D^{20} + 25^\circ$.

dl.

Fine needles from EtOH.Aq. M.p. 232° (206°) decomp. Insol. MeOH, Et₂O, AcOEt.

Et ester: $\text{C}_{12}\text{H}_{23}\text{O}_4\text{N}_3$. MW, 273. M.p. 51°.

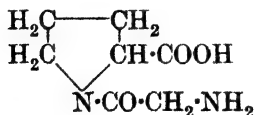
Fischer, Brunner, *Ann.*, 1905, **340**, 150.

Abderhalden, *Fermentforschung*, 1930, **11**, 143; 1928, **10**, 179, (*Chem. Abstracts*, 1930, **24**, 1623; 1929, **23**, 1113).

Abderhalden, Möller, *Z. physiol. Chem.*, 1928, **174**, 206.

Glycyl-p-phenetidine.

See under *p*-Phenetidine.

Glycyl-l-proline (*N*-Aminoacetylpyrrolidine-2-carboxylic acid)

$\text{C}_7\text{H}_{12}\text{O}_3\text{N}_2$ MW, 172

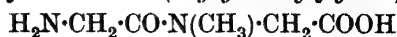
Prisms from MeOH.Aq. M.p. 185°. $[\alpha]_D^{20} - 113.8^\circ$ in H_2O ($[\alpha]_D^{18} - 86.2^\circ$). Hygroscopic.

Anhydride: m.p. 180–3°. $[\alpha]_D^{20} - 202^\circ$.

Bergmann, Zervas, *Ber.*, 1932, **65**, 1192.

Abderhalden, Zumstein, *Fermentforschung*, 1930, **12**, 1, (*Chem. Abstracts*, 1931, **25**, 77).

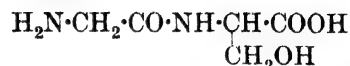
Abderhalden, Komm, *Z. physiol. Chem.*, 1925, **145**, 308.

Glycylsarcosine (*Glycylmethylglycine*)

$\text{C}_5\text{H}_{10}\text{O}_3\text{N}_2$ MW, 146

Cryst. from EtOH.Aq. M.p. 220° (200–1°).

Levene, Simms, Pfaltz, *J. Biol. Chem.*, 1924, **61**, 450.

Glycyl-dl-serine

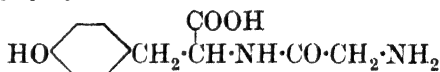
$\text{C}_5\text{H}_{10}\text{O}_4\text{N}_2$ MW, 162

Plates from MeOH.Aq. M.p. 207° decomp. (yellow at 195°). Very sol. H_2O . Spar. sol. MeOH. Insol. Et₂O.

Anhydride: thick rods from H_2O . M.p. 227° (sinters at 220°). Spar. sol. EtOH.

Fischer, Roesner, *Ann.*, 1910, **375**, 201.

Cf. Bergmann, Miekeley, *Z. physiol. Chem.*, 1924, **140**, 128.

Glycyltyrosine

$\text{C}_{11}\text{H}_{14}\text{O}_4\text{N}_2$ MW, 238

d.

Amorphous. M.p. 160° decomp. (sinters at 120°).

l.

M.p. 165° decomp. (sinters at 125°). Sol. H_2O , MeOH. Spar. sol. EtOH. Insol. Et₂O.

Et ester hydrochloride: $\text{C}_{13}\text{H}_{19}\text{O}_4\text{N}_2\text{Cl}$. MW, 302.5. M.p. 245° decomp.

Anhydride: needles. M.p. 295° decomp. $[\alpha]_D^{20} + 125.4^\circ$.

dl.

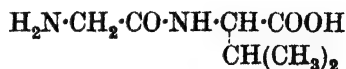
Anhydride: cryst. from hot H_2O . M.p. 255–7°. Sol. alkalis. Very spar. sol. cold H_2O and dil. acids. Insol. EtOH, Et₂O.

Fischer, Schrauth, *Ann.*, 1907, **354**, 21.

Fischer, *Ber.*, 1904, **37**, 2496.

Greenstein, *J. Biol. Chem.*, 1932, **95**, 465.

Abderhalden, *Fermentforschung*, 1931, **12**, 295; 1930, **11**, 399, (*Chem. Abstracts*, 1931, **25**, 2694; 1930, **24**, 3218).

Glycylvaline

$\text{C}_7\text{H}_{14}\text{O}_3\text{N}_2$ MW, 174

d.

Needles from EtOH.Aq. M.p. 254° (sinters at

239°). Sol. 2 parts cold H_2O . $[\alpha]_D^{20} - 19.6^\circ$ in H_2O ; $- 10.5^\circ$ in normal HCl ; $- 6.9^\circ$ in normal NaOH .

Anhydride: needles. M.p. 266° (sinters at 260°). $[\alpha]_D^{20} + 20.5^\circ$ in AcOH ; $+ 33^\circ$ in H_2O .

l.

$[\alpha]_D^{25} + 20.3^\circ$ in H_2O .

dl.

M.p. 240° .

Dichloroacetyl deriv.: m.p. 152° .

Benzoyl deriv.: m.p. $135-6^\circ$.

$\text{C}_6\text{H}_5\text{NCO deriv.}$: m.p. 155° .

Fischer, Scheibler, *Ann.*, 1908, **363**, 140.

Levene, Steiger, Rothen, *J. Biol. Chem.*, 1932, **97**, 717.

Abderhalden, *Fermentforschung*, 1928, **10**, 213, (*Chem. Abstracts*, 1929, **23**, 1389).

Glycyrrhetic Acid

$\text{C}_{45}\text{H}_{72}\text{O}_6$

MW, 708

The aglucone from glycyrrhizin, the sweet principle of liquorice, *Glycyrrhiza glabra*, Linn. Needles from $\text{AcOH-Et}_2\text{O}$ -ligroin. M.p. $297-8^\circ$. K salt of glycyrrhetic acid heated with HI and $\text{PH}_4\text{I} \rightarrow$ deoxyglycyrrhetin, m.p. $298-300^\circ$. Se at $340^\circ \rightarrow$ sapotalin (1:2:7-trimethylnaphthalene).

Me ester: $\text{C}_{46}\text{H}_{74}\text{O}_6$. MW, 722. Needles from EtOH . M.p. 241° .

Et ester: $\text{C}_{47}\text{H}_{76}\text{O}_6$. MW, 736. Needles from EtOH . M.p. $246-8^\circ$.

Karrer, Karrer, Chao, *Helv. Chim. Acta*, 1921, **4**, 100, (cf. Galassi, *Chem. Abstracts*, 1928, **22**, 385; Ruzicka, van Veen, *Z. physiol. Chem.*, 1929, **184**, 69).

Glycyrrhizin.

See under Glycyrrhetic Acid.

Glyoxal (Diformyl)



$\text{C}_2\text{H}_2\text{O}_2$

MW, 58

Yellow prisms. M.p. 15° . B.p. 51° . The vapour has green col. and burns with violet flame. $D^{20} 1.14$. $n_D^{20} 1.3826$. Very sol. ord. org. solvents. Polymerises on standing or in presence of trace of H_2O . Aq. sol. contains monomolecular glyoxal, reacts weakly acid, reduces NH_3 , AgNO_3 , does not reduce Fehling's.

Tetra-acetate: tetragonal cryst. from H_2O or AcOH . M.p. $106-7^\circ$.

Tetra-Et acetal: $\text{C}_{10}\text{H}_{22}\text{O}_4$. MW, 206. B.p. 180° , $88-9^\circ/14$ mm.

Phenylosazone: m.p. $169-70^\circ$ part. decomp.

p-Bromophenylosazone: m.p. 215° decomp.

p-Chlorophenylosazone: m.p. 227° decomp.

p-Nitrophenylosazone: m.p. 310° decomp.

Dioxime: see Glyoxime.

"Sulphate": $[-\text{CHO}_2\text{SO}_2]_2$. Colourless needles. M.p. $176-7^\circ$. Sol. H_2O .

Consortium für elektrochemische Industrie, D.R.P., 573,721, (*Chem. Abstracts*, 1933, **27**, 4253).

I.C.I., F.P., 734,537; D.R.P., 574,162, (*Chem. Abstracts*, 1933, **27**, 999, 3486).

I.G., D.R.P., 521,722, (*Chem. Abstracts*, 1931, **25**, 3363).

Ruggli, Henzi, *Helv. Chim. Acta*, 1929, **12**, 362.

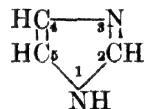
Kindler, *Ber.*, 1921, **54**, 647.

Hess, Uibrig, *Ber.*, 1917, **50**, 365.

Glyoxalic Acid.

See Glyoxylic Acid.

Glyoxaline (Iminazole, 1:3-diazole)



$\text{C}_3\text{H}_4\text{N}_2$

MW, 68

Thick prisms. M.p. $88-9^\circ$. B.p. 255° . Easily sol. H_2O , EtOH , Et_2O . Strongly basic. Un-attacked by H_2CrO_4 . KMnO_4 . Aq. \rightarrow formic acid. $\text{H}_2\text{O}_2 \rightarrow$ oxamide.

Benzoyl: leaflets. M.p. $202-3^\circ$. *Dibromide*: m.p. 255° .

B_2AuCl_3 : decomp. at 190° .

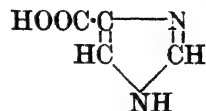
B_2HAuCl_4 : yellow needles. Decomp. at 230° .

Oddo, *Gazz. chim. ital.*, 1932, **62**, 1092; 1928, **58**, 573; 1926, **56**, 958.

Ruggli, Henzi, *Helv. Chim. Acta*, 1929, **12**, 362 (*Bibl.*).

Pyman, *J. Soc. Dyers Colourists*, 1920, **36**, 107 (*Review*).

Glyoxaline-4-carboxylic Acid (Iminazole-4-carboxylic acid)



$\text{C}_4\text{H}_4\text{O}_2\text{N}_2$

MW, 112

Amide: $\text{C}_4\text{H}_5\text{ON}_3$. MW, 111. Cryst. $+ \text{H}_2\text{O}$. M.p. 214° . *Hydrochloride*: m.p. 220° . *Picrate*: m.p. 208° .

Picrate: m.p. 195° .

Hydrazide: cryst. + $1\text{H}_2\text{O}$. M.p. 213° .
Picrate: m.p. 223° .

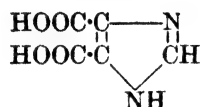
Gerard, Parrod, *Compt. rend.*, 1930, **190**, 328.

Yabuta, Kambe, *Chem. Abstracts*, 1933, **27**, 1882.

Balaban, *J. Chem. Soc.*, 1930, 270.

Parrod, *Bull. soc. chim.*, 1933, **53**, 196.

Glyoxaline-4 : 5-dicarboxylic Acid (*Iminazole-4 : 5-dicarboxylic acid*)



$\text{C}_5\text{H}_4\text{O}_4\text{N}_2$

MW, 156

Prisms. M.p. 288° decomp. k (first) = 2.85×10^{-4} ; (second) = 6.44×10^{-10} .

Mono-K salt: cryst. + $1\text{H}_2\text{O}$. M.p. 281° .

Yllner, *Chem. Abstracts*, 1928, **22**, 589.

Tamamushi, *Chem. Abstracts*, 1929, **23**, 1639.

Glyoxaline-2-sulphonic Acid



$\text{C}_3\text{H}_4\text{O}_3\text{N}_2\text{S}$

MW, 148

Colourless prisms + $1\text{H}_2\text{O}$ from H_2O . M.p. 303° (softens and darkens at 285°). Readily sol. hot H_2O . Sol. 8 parts cold H_2O . Insol. EtOH.

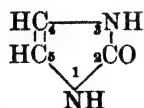
Barnes, Pyman, *J. Chem. Soc.*, 1927, 2711.

Glyoxaline-4(5)-sulphonic Acid.

Anhydrous cubes from H_2O . M.p. 307° .

See previous reference.

Glyoxalone (2-Iminazolone)



$\text{C}_3\text{H}_4\text{ON}_2$

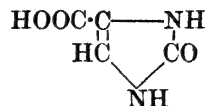
MW, 84

Pyramidal cryst. Decomp. at $250-1^\circ$ (darkens at 225°). Sol. hot H_2O , acids, alkalis.

1 : 3-Diacetyl: silky needles. M.p. $105-6^\circ$.

Hilbert, *J. Am. Chem. Soc.*, 1932, **54**, 3413.

Glyoxalone-4-carboxylic Acid (2-Iminazolone-4-carboxylic Acid)



$\text{C}_4\text{H}_4\text{O}_3\text{N}_2$

MW, 128

Colourless nodules from hot H_2O . M.p. 261° decomp. Insol. ord. org. solvents. Reduces Tollen's reagent and $\text{NH}_3\cdot\text{AgNO}_3$. Aq. sol. + $\text{FeCl}_3 \rightarrow$ dark brown col. $\text{CrO}_3 \rightarrow$ parabanic acid.

Et ester: $\text{C}_6\text{H}_8\text{O}_3\text{N}_2$. MW, 156. Glistening plates from EtOH. Aq. M.p. 255° .

See previous reference.

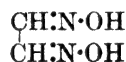
Glyoxalylurea.

See Allanturic Acid.

Glyoxylylcarbinol.

See Glycerosone.

Glyoxime (*Glyoxal-dioxime, di-isonitrosoethane*)



$\text{C}_2\text{H}_4\text{O}_2\text{N}_2$

MW, 88

Plates from H_2O . M.p. 178° . Sublimes. Sol. hot H_2O , EtOH, Et₂O. Aq. sol. reacts weakly acidic.

Dibenzoyl: m.p. 139° .

Milone, *Chem. Abstracts*, 1933, **27**, 706.

Bamberger, Seligman, *Ber.*, 1903, **36**, 3831.

Hantzsch, Wild, *Ann.*, 1896, **289**, 293.

Glyoximic Acid.

See Isonitrosoacetic Acid.

Glyoxylic Acid (*Glyoxalic acid, aldehydoformic acid*)



$\text{C}_2\text{H}_2\text{O}_3$

MW, 74

Occurs in plant and animal tissues and fluids. Colourless prisms. M.p. 98° . Very sol. cold $\text{H}_2\text{O} \rightarrow$ yellow sol. Spar. sol. EtOH, Et₂O, C_6H_6 . Slowly reduces $\text{NH}_3\cdot\text{AgNO}_3$. $k = 0.474 \times 10^{-3}$ at 25° . Heat above m.p. \rightarrow glycollic + oxalic acids + H_2O .

Me ester: $\text{C}_3\text{H}_4\text{O}_3$. MW, 88. Leaflets. M.p. 53° . *Semicarbazone*: m.p. 206° decomp.

Et ester: $\text{C}_4\text{H}_6\text{O}_3$. MW, 102. B.p. 130° .

Phenylhydrazones: m.p. $129-30^\circ$. *Semicarbazone*: m.p. 218° (228°). 2 : 4-Dichlorophenylhydrazones: m.p. 122° . 2 : 4 : 6-Tribromophenylhydrazones: m.p. 126° .

Di-Et acetal: diethoxyacetic acid. $\text{C}_6\text{H}_{12}\text{O}_4$. MW, 148. B.p. $108-10^\circ/11$ mm. *Et ester*:

$C_8H_{16}O_4$. MW, 176. B.p. 199° , $83-5^\circ/13$ mm. D^{20}_D 0.994.

Phenylhydrazone: (α) Decomp. on heating. (β) M.p. 144° (137°) decomp.

p-Nitrophenylhydrazone: m.p. 200° decomp.

2:4-Dichlorophenylhydrazone: decomp. at 150° .

2:4-Dinitrophenylhydrazone: m.p. 190° decomp.

2:4:6-Tribromophenylhydrazone: m.p. 170° decomp.

Benzylphenylhydrazone: m.p. 172° .

Oxime: see Isonitrosoacetic Acid.

Semicarbazone: m.p. 240° ($202-3^\circ$) decomp.

Diureide: see Allantoin.

Mohrschulz, Z. Elektrochem., 1926, 32, 434.

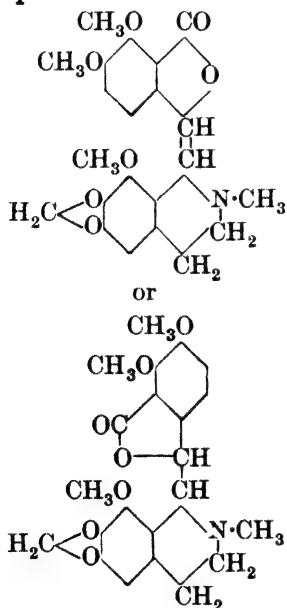
Hatcher, Holden, Chem. Abstracts, 1926, 20, 323.

Avy, Bull. soc. chim., 1931, 49, 14.

α -Gnoscopine.

See Narcotine.

β -Gnoscopine



$C_{22}H_{23}O_7N$

MW, 413

Prisms from MeOH. M.p. 180° . HNO_3 . Aq. \rightarrow cotarnine + opianic acid.

B, *HCl*: m.p. $86-8^\circ$ ($224-6^\circ$ on standing).

Picrate: m.p. $199-201^\circ$.

Hope, Robinson, J. Chem. Soc., 1914, 105, 2085.

Marshall, Pyman, Robinson, J. Chem. Soc., 1934, 1318.

Gorlic Acid

$C_{18}H_{30}O_2$

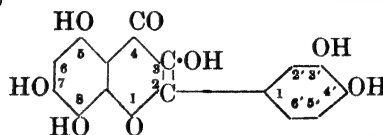
MW, 278

Occurs as glyceride in *Oncoba echinata*, Oliver (Gorli). Oil. D^{18}_D 0.9364. Turns yellow in air.

Amide: $C_{18}H_{33}ON$. MW, 277. Cryst. from Me_2CO . M.p. 95° .

André, Jouatte, Bull. soc. chim., 1928, 43, 352.

Gossypetin (3:5:7:8:3':4'-Hexahydroxy flavone)



$C_{15}H_{10}O_8$

MW, 318

Colouring matter of Indian cotton flowers, *Gossypium herbaceum*, Linn. and other *G.* species and of *Hibiscus sabdariffa*, Linn. Yellow needles. M.p. $311-13^\circ$ ($310-14^\circ$).

3:5:8:3':4'-Penta-Me ether: $C_{20}H_{20}O_8$. MW, 388. M.p. $253-4^\circ$.

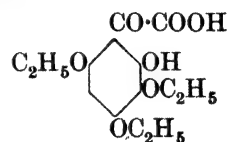
Hexa-Me ether: $C_{21}H_{22}O_8$. MW, 402. M.p. $170-2^\circ$.

Hexa-Et ether: $C_{27}H_{34}O_8$. MW, 486. M.p. $144-6^\circ$.

Hexa-acetyl: m.p. $229-30^\circ$.

Baker, Nodzu, Robinson, J. Chem. Soc., 1929, 74 (Bibl.).

Gossypetonic Acid (2-Hydroxy-3:4:6-triethoxybenzoylformic acid)



$C_{14}H_{18}O_7$

MW, 298

Yellow needles from C_6H_6 . M.p. $154-5^\circ$ decomp.

Perkin, J. Chem. Soc., 1913, 103, 655.

Gossypic Acid

$C_{12}H_{14}O_4$

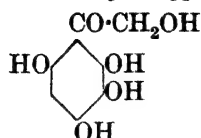
MW, (222)_n

Cryst. from EtOH. M.p. 241° . $FeCl_3$ on EtOH sol. \rightarrow violet col.

Me ether: $(C_{13}H_{16}O_4)_n$. MW, (236)_n. M.p. 225° . *Me ester*: $(C_{14}H_{18}O_4)_n$. MW, (250)_n. M.p. 142° .

Karrer, Tobler, Helv. Chim. Acta, 1932, 15, 1209.

Gossypitol (ω -2 : 3 : 4 : 6-Pentahydroxyacetophenone, 2 : 3 : 4 : 6-tetrahydroxyphenacyl alcohol)



$C_8H_8O_6$ MW, 200

ω -3 : 4 : 6-Tetra-Me ether : $C_{12}H_{16}O_6$ MW, 256. Needles from EtOH. M.p. 115–16°.

ω -2 : 3 : 4-Tetra-Et ether : $C_{16}H_{24}O_6$ MW, 312. M.p. 46–8°. Oxime : m.p. 93–5°.

ω -3 : 4 : 6-Tetra-Et ether : m.p. 110–11°. Oxime : m.p. 127–9°.

Perkin, *J. Chem. Soc.*, 1913, 103, 653.

Gossypitone

$C_{15}H_8O_8$ MW, 316

Red needles. Sol. Py, quinoline. Spar. sol. hot H_2O . Insol. EtOH, $PhNO_2$. Alkalis \rightarrow blue col.

Hexa-acetyl deriv. : m.p. 228–30°.

Perkin, *J. Chem. Soc.*, 1913, 103, 657.

Gossypol

$C_{30}H_{30}O_8$ MW, 518

Toxic principle of cottonseed. Yellow cryst. from Et_2O -pet. ether. M.p. 199°.

Dihydrazone : m.p. about 285°.

Clark, *J. Am. Chem. Soc.*, 1929, 51, 1475.

Karrer, Tobler, *Helv. Chim. Acta*, 1932, 15, 1204.

Gossypose.

See Raffinose.

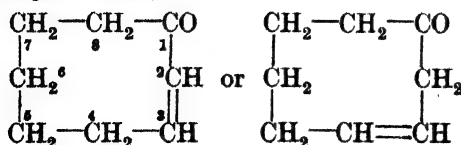
Gossypyl Alcohol

$C_{30}H_{62}O$ MW, 438

Occurs in wax of American cotton. (α) M.p. 87–8°. Spar. sol. $CHCl_3$, Et_2O . (β) M.p. 86°. Mod. sol. $CHCl_3$, Et_2O . (γ) M.p. 82–3°. Sol. $CHCl_3$, Et_2O .

Fargher, Probert, *Chem. Abstracts*, 1923, 17, 1890; 1924, 18, 2813.

Granatal (Δ^2 (or Δ^3)-Cyclo-octenone, 3 (or 4)-ketocyclo-octene)



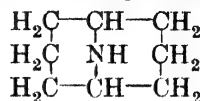
$C_8H_{12}O$

MW, 124

B.p. 200–1°, 73.3–74°/8 mm. D_4^{20} 0.990. Sol. ord. org. solvents. Reduces Tollen's reagent. Ox. \rightarrow adipic acid.

Willstätter, Waser, *Ber.*, 1911, 44, 3424.

Granatanine (Dihydrogranatenine, 2 : 6-trimethylenepiperidine, "norggranatanine")



$C_8H_{15}N$ MW, 125

Needles. M.p. 50–60°. Zn dust dist. \rightarrow 2-propylpyridine.

$B,HAuCl_4$: yellow plates from H_2O . M.p. 225°. Sol. hot H_2O .

B_2,H_2PtCl_6 : yellow plates from dil. HCl. M.p. above 255°.

N-Benzoyl: needles from pet. ether. M.p. 111°.

N-Nitroso: cryst. from pet. ether. M.p. 148°. Sol. hot H_2O , Et_2O , C_6H_6 .

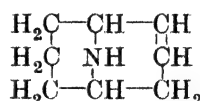
N-Me: see N-Methylgranatanine.

Ciamician, Silber, *Ber.*, 1893, 26, 2750; 1894, 27, 2851.

Granataninol.

See Granatoline.

Granatenine



$C_8H_{13}N$ MW, 123

Free base not isolated.

$B,HAuCl_4$: yellow plates from dil. HCl. M.p. 186°.

B_2,H_2PtCl_6 : yellowish-red cryst. M.p. above 260°.

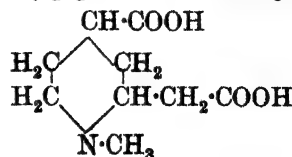
N-Me: see N-Methylgranatenine.

Ciamician, Silber, *Ber.*, 1894, 27, 2857.

Granatic Acid.

There are two Granatic Acids described in the literature.

(1) Granatic Acid (N-Methylpiperidine-4-carboxylic acid-2-acetic acid, homotropinic acid, 2-[N-methyl-4-carboxypiperidyl]-acetic acid, N-methyl-2-carboxymethylpiperidine-4-carboxylic acid)



$C_9H_{16}O_4N$

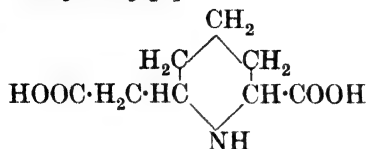
MW, 201

M.p. 240–5° decomp.

$B, HAuCl_4$: m.p. 190° decomp.

Ciamician, Silber, *Ber.*, 1896, **29**, 487.

(2) Granatic Acid (*Piperidine-2-carboxylic acid-6-acetic acid*, 2-[6-carboxypiperidyl]-acetic acid, 6-carboxymethylpiperidine-2-carboxylic acid)



$C_8H_{13}O_4N$

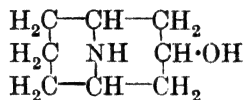
MW, 187

Yellow prisms. M.p. 270°.

N-Me di-Me ester: $C_{11}H_{19}O_4N$. MW, 229.
Oil. *Methiodide*: m.p. 167°.

Piccinini, *Gazz. chim. ital.*, 1899, **29**, i, 415; ii, 104.

Granatoline (*Granataninol*, 3-hydroxygranatanine)



$C_8H_{15}ON$

MW, 141

Needles and prisms from Et_2O . M.p. 134°.
Sol. H_2O , $EtOH$. Spar. sol. Et_2O .

$B, HAuCl_4$: yellow needles and prisms from dil. HCl . M.p. 215°.

N-Nitroso: plates + H_2O . M.p. 72–3°, anhyd. 125°.

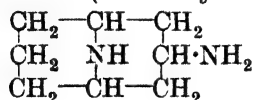
N-Acetyl: m.p. 120°. *O-Acetyl*: m.p. 80°.

N-Me: see *N-Methylgranatoline*.

Ciamician, Silber, *Ber.*, 1894, **27**, 2855.

Note. These authors refer to the above compound as "Norgrenatoline" and the *N-Me* deriv. as "Granatoline."

Granatylamine (3-Aminogranatanine)



$C_8H_{15}N_2$

MW, 139

Imino-N-Me: $C_9H_{17}N_2$. MW, 153. Oil.
B.p. 235–40° decomp., 160–70°/60 mm. Sol. H_2O . *Platinichloride*: m.p. 260–1° decomp.

$B, (HAuCl_4)_2$: yellow cryst. M.p. 238–9°.

Piccinini, Cortese, *Gazz. chim. ital.*, 1901, **31**, i, 566.

Piccinini, Quartaroli, *Gazz. chim. ital.*, 1899, **29**, ii, 119.

ψ-Granatylamine.

Stereoisomer of granatylamine. Prisms from pet. ether. M.p. 125°. Hygroscopic.

Picrate: decomp. at 230–47°.

Imino-N-Me: oil. B.p. 232–6°. Sol. H_2O .

Platinichloride: m.p. 265° decomp. $B, (HAuCl_4)_2$: m.p. 231–2° decomp. *Picrate*: m.p. 239–40° decomp.

Platinichloride: m.p. 256°.

Aurichloride: m.p. 208° decomp.

See first reference above.

Gratiogenin

$C_{31}H_{50}O_5$

MW, 502

Plates from $EtOH$. M.p. 198°. Sol. $EtOH$.
Spar. sol. H_2O , Et_2O .

Retzlaff, *Chem. Zentr.*, 1903, I, 42.

Gratioligenin

$C_{37}H_{60}O_{10}$

MW, 664

Needles from $EtOH$. M.p. 285°. Spar. sol. $EtOH$. Insol. H_2O , Et_2O . Hyd. → glucose + gratiogenin.

See previous reference.

Gratiolin

$C_{43}H_{70}O_{15}$

MW, 826

Digluco-side from tubers of *Gratiola officinalis*.
Needles. M.p. 235–7° decomp. Sol. $EtOH$.
Spar. sol. H_2O . Insol. Et_2O . Hyd. → glucose + gratiogenin.

See previous reference.

Grayanotoxin

$C_{20}H_{30}(O \cdot CO \cdot CH_3)(OH)_3$

or

$C_{21}H_{34}(O \cdot CO \cdot CH_3)(OH)_3$

$C_{22}H_{36}O_5$ ($C_{23}H_{40}O_5$) MW, 380 (396)

Occurs in leaves of *Leucophoe grayana*, Max.
M.p. 238–238.5°. Sol. $AcOH$. Mod. sol. $CHCl_3$.
Spar. sol. H_2O . $[\alpha]_D - 3.15^\circ$ in $AcOH$.

Triacetyl deriv.: m.p. 211.5–212.5°.

Tribenzoyl deriv.: m.p. 201–201.5°.

Yamashita, *Chem. Abstracts*, 1933, **27**, 303.

Grindelol

$C_{23}H_{38}O_4$

MW, 378

Phytosterol glucoside from *Grindelia camporum*. M.p. 257°.

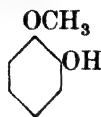
Acetyl deriv.: m.p. 161°.

Power, Salway, *J. Chem. Soc.*, 1913, 103, 402.

Guacamphol.

See under *d*-Camphoric Acid.

Guaiacol (*Catechol methyl ether, o-hydroxy-anisole, o-methoxyphenol*)



$C_7H_8O_2$ MW, 124
(a) Prisms. F.p. 28-20°. M.p. 32° (28-4°). B.p. 205° (204-65°/746 mm.), 106-5°/24 mm. D_4^{25} 1.1287. (b) Needles. F.p. -3-2°. Sol. ord. org. solvents. Spar. sol. H_2O . $FeCl_3 \rightarrow$ green col.

Formyl: guaiacol formate. B.p. 80°/1 mm. D_4^{25} 1.1251. n_D^{25} 1.51364.

Acetyl: guaiacol acetate. B.p. 107°/22 mm. (123-4°/13 mm.). D_4^{25} 1.1285. n_D^{25} 1.5101.

Mono-guaiacol carbonate: *Me ester*: $C_9H_{10}O_4$. MW, 182. B.p. 132-4°/16 mm. *Et ester*: $C_{10}H_{12}O_4$. MW, 196. B.p. 265°. *Propyl ester*: $C_{11}H_{14}O_4$. MW, 210. B.p. 201-2°/90 mm. D_4^{25} 1.116. n_D^{25} 1.49872. *Phenyl ester*: $C_{14}H_{12}O_4$. MW, 244. M.p. 82°.

Di-guaiacol carbonate: duotal. $C_{15}H_{14}O_5$. MW, 274. M.p. 86°.

Di-guaiacol oxalate: $C_{16}H_{14}O_6$. MW, 302. M.p. 127°.

Mono-guaiacol succinate: $C_{11}H_{12}O_5$. MW, 224. M.p. 75°.

Di-guaiacol succinate: $C_{18}H_{18}O_6$. MW, 330. M.p. 135°.

Benzoyl: guaiacol benzoate. M.p. 57-8°.

3:5-Dinitrobenzoyl: m.p. 141-2°.

Cinnamoyl: see Styralcol.

p-Bromobenzenesulphonyl: m.p. 103-4°.

Picrate: m.p. 90°.

Me ether: see Veratrol.

Et ether: 1-methoxy-2-ethoxybenzene, *o*-methoxyphenetole. $C_9H_{12}O_2$. MW, 152. B.p. 207-9°, 104°/18 mm. D_4^{25} 1.0433. n_D^{25} 1.5210.

Propyl ether: 1-methoxy-2-propoxybenzene, propyl *o*-methoxyphenylether. $C_{10}H_{14}O_2$. MW, 166. B.p. 142-3°/68 mm. D_4^{25} 1.0174. n_D^{25} 1.5119.

n-Butyl ether: 1-methoxy-2-butoxybenzene, butyl *o*-methoxyphenylether. $C_{11}H_{16}O_2$. MW, 180. B.p. 178°/132 mm. D_4^{25} 0.9990. n_D^{25} 1.5067.

Vinyl ether: $C_9H_{10}O_2$. MW, 150. B.p. 202-3°.

Allyl ether: $C_{10}H_{12}O_2$. MW, 164. B.p. 116°/14 mm. D_4^{25} 1.058.

β -Bromoethyl ether: $C_9H_{11}O_2Br$. MW, 231. M.p. 43-5°. B.p. 135-40°/7 mm.

β -Hydroxyethyl ether: $C_9H_{12}O_3$. MW, 168. B.p. 166-7°/22 mm.

1-Monoglyceryl ether: guaiamar. $C_{10}H_{14}O_4$. MW, 198. M.p. 78-5-9°.

1:3-Diglyceryl ether: $C_{17}H_{20}O_5$. MW, 304. M.p. 72-5°.

d-Glucoside: $C_{13}H_{18}O_7$. MW, 286. M.p. 156-5-7°.

Cetyl ether: $C_{23}H_{40}O_2$. MW, 348. M.p. 54°. D_4^{25} 0.8740.

Phenyl ether: see under 2-Hydroxydiphenyl Ether.

Benzyl ether: $C_{14}H_{14}O_2$. MW, 214. M.p. 57-5-58-5°. B.p. 168-70°/13 mm. n_D^{25} 1.5780.

Phenacyl ether: see under *o*-Hydroxyphenyl phenacyl Ether.

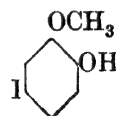
Tanaka, Ishimasa, Koyama, *Chem. Abstracts*, 1926, 20, 2670.

Gallotti, *Chem. Abstracts*, 1933, 27, 4530 (*Bibl.*).

Titherley, Hudson, U.S.P., 1,878,061, (*ibid.*, 312).

Hirao, *J. Chem. Soc. Japan*, 1932, 53, 488.

Guaiadol (5-Iodoguaiacol, 4-iodocatechol 2-methyl ether)



$C_7H_7O_2I$ MW, 250

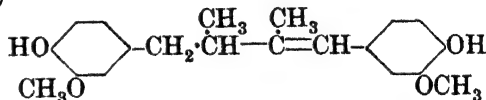
Prisms. M.p. 43°. Sol. ord. org. solvents. Spar. sol. H_2O .

Mameli, Pinna, *Chem. Zentr.*, 1907, II, 2045.

Guaiamar.

See under Guaiacol.

Guaiaretic Acid (2-[4-Hydroxy-3-methoxybenzyl]-3-[4-hydroxy-3-methoxybenzylidene]-butane)



$C_{20}H_{24}O_4$ MW, 328

Leaflets from EtOH. M.p. 99-100-5°. $[\alpha]_D^{25}$ -94° in EtOH.

dl-Di-Me ether: $C_{22}H_{28}O_4$. MW, 356. Plates from MeOH. M.p. 112-13°.

Di-Et ether: $C_{24}H_{32}O_4$. MW, 384. *l*-. prisms from MeOH. M.p. 95-6°. $[\alpha]_D^{25}$ -48-0° in EtOH. *dl*-. prisms. M.p. 103-4°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 1423 (*Bibl.*).

Haworth, Richardson, *J. Chem. Soc.*, 1935, 120.

Guaiene.

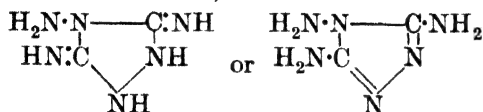
See 2 : 3-Dimethylnaphthalene.

Guaiene-quinone.

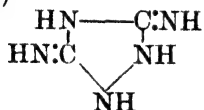
See under 2 : 3-Dimethylnaphthalene.

Guaiol (Champacol) $C_{15}H_{26}O$ MW, 222

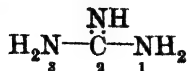
Sesquiterpene alcohol occurring in guaiacum resin. Prisms from EtOH. M.p. 91°. B.p. 288°.

Ruzicka, Haagen-Smit, *Helv. Chim. Acta*, 1931, 14, 1122.**Guanazine** (4-(N-)Aminoguanazole, 4-amino-3 : 5-di-imino-1 : 2 : 4-triazole, or 3 : 4 : 5-tri-amino-1 : 2 : 4-triazole) $C_2H_6N_6$ MW, 114Yellowish-white cryst. from H_2O or EtOH. M.p. 257° decomp. Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O . Reacts alkaline. Reduces warm NH_3 , $AgNO_3$ and Fehling's. B, HNO_3 : m.p. 210°. B_2, H_2SO_4, H_2O : m.p. 275°. $B, CH_3\cdot COOH, 1\frac{1}{2}H_2O$: m.p. 175°.

Triacetyl deriv. : needles from EtOH. M.p. 240°.

Pellizzari, Repetto, *Gazz. chim. ital.*, 1907, 37, ii, 317.**Guanazole** (3 : 5 - Di - imino - tetrahydro-1 : 2 : 4-triazole) $C_2H_5N_5$ MW, 99Prisms from H_2O . M.p. 206°. Sol. H_2O , EtOH. Insol. Et_2O , $CHCl_3$, C_6H_6 . $FeCl_3 \rightarrow$ red col. B, HCl : m.p. 100°. $B, 2HCl$: m.p. 145°. B, HNO_3 : m.p. 165°.

Picrate : m.p. 245°.

Pellizzari, *Gazz. chim. ital.*, 1894, 24, i, 491; 1901, 31, i, 500.**Guanidine (Carbamidine, iminourea)** CH_5N_3 MW, 59

Cryst. caustic solid.

 B, HNO_2 : m.p. 76-78.5°. B, HNO_3 : m.p. 214°. $B, HClO_3$: m.p. 100-1°. $B, HClO_4$: m.p. 245-6°. B_2, H_2CO_3 : m.p. 197°. B_2, H_2CS_3 : m.p. 133-5°. $B, CH_3\cdot COOH$: m.p. 229-30°. $B, CH_2Br\cdot CHBr\cdot COOH$: m.p. 107-8°. $CH_5N_3O\cdot OC\cdot COO\cdot C_2H_5$: m.p. 134-6°. $CH_5N_3O\cdot OC\cdot CH_2\cdot CH_2\cdot COO\cdot C_2H_5$: m.p. 136-8°. $B, C_6H_5SO_3H$: m.p. 209-10°.

Alizarin-disulphonate : m.p. 259°.

Picrate : m.p. 333°.

m-Br-picrolonate : decomp. at 275°.

1-N-Formyl : m.p. 178° decomp.

1-N-Acetyl : m.p. 145°.

1-N-Chloroacetyl : m.p. 125°.

1-N-Trichloroacetyl : m.p. 183°.

1 : 2-N-Diacetyl : m.p. 271°.

1 : 3-N-Diacetyl : m.p. 152°.

1-N-Propionyl : B, HCl , m.p. 170-1°. $B, HAuCl_4$, m.p. 187°. B_2, H_2PtCl_6 , m.p. 207-8°.

1 : 3-N-Dipropionyl : m.p. 85-6°.

1-N-Hippuryl : m.p. 183°. Picrate, decomp. above 300°.

N-Benzenesulphonyl : m.p. 212°. Picrate, m.p. 190-1°.

Manvelli, *Ann. chim. applicata*, 1933, 23, 235 (Review).Müller, *Z. physiol. Chem.*, 1932, 209, 207.Gluud, Keller, Schultze, *Chem. Abstracts*, 1932, 26, 2017; D.R.P., 545,713, (*ibid.*, 3517).Sander, D.R.P., 527,237, (*Chem. Abstracts*, 1931, 25, 4559).Smith, Sabetta, Steinbach, *Ind. Eng. Chem.*, 1931, 23, 124.Lecher, *Z. physiol. Chem.*, 1928, 176, 43.Schotte, Priewe, Roescheisen, *Z. physiol. Chem.*, 1928, 174, 119.Pellizzari, *Memorie della reale accademia nazionale dei Lincei*, 1924, 14, 707 (Review).**Guanidinoacetic Acid.**

See Glycocyamine.

4-Guanidinobutylamine.

See Agmatine, Addendum Vol. I, p. 689.

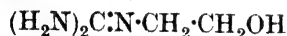
3-[1-Guanidino]-butyric Acid $C_5H_{11}O_2N_3$ MW, 145Cryst. + $2H_2O$ from H_2O . B, HCl : m.p. 184°. $B, HAuCl_4$: m.p. 198-200°.Engeland, Kutscher, *Ber.*, 1910, 43, 2882.

2-[1-Guanidino]-ethyl Alcohol (1- β -Hydroxyethylguanidine)
 $\text{C}_3\text{H}_9\text{ON}_3$ MW, 103

Benzoyl deriv. : picrate, m.p. 186°.

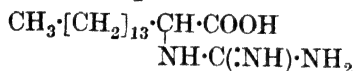
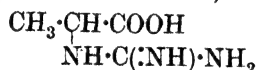
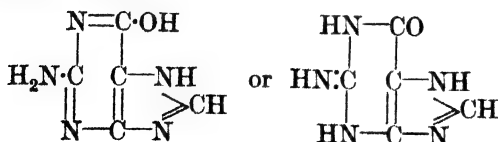
Tribenzoyl deriv. : m.p. 156°.

Picrate : m.p. 147°.

Fromm, Fantl, Fisch, *J. prakt. Chem.*, 1930, 124, 163.**2-[2-Guanidino]-ethyl Alcohol** (2- β -Hydroxyethylguanidine)
 $\text{C}_3\text{H}_9\text{ON}_3$ MW, 103

M.p. 100-1°.

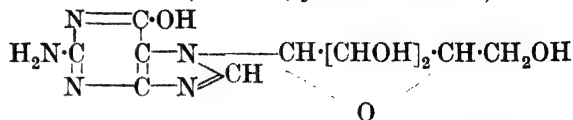
Picrate : m.p. 148-148.5°.

Kawai, *Chem. Abstracts*, 1931, 25, 5665.**dl-1-Guanidinopalmitic Acid**
 $\text{C}_{17}\text{H}_{35}\text{O}_2\text{N}_3$ MW, 313
Cryst. from hot MeOH. M.p. 173° decomp. Spar. sol. EtOH. Insol. H_2O , Et_2O , Me_2CO .*B, HCl* : decomp. at 132-4°.*B, HNO*₃ : m.p. 155-6° decomp.Ramsay, *Ber.*, 1908, 41, 4391.**dl-1-Guanidinopropionic Acid** (*Alano-cyamine, alacreatine, isocreatine*)
 $\text{C}_4\text{H}_9\text{O}_2\text{N}_3$ MW, 131
Prisms from H_2O . M.p. 226° decomp. (rapid heat.). Sol. H_2O . Insol. Et_2O , Me_2CO .Ramsay, *Ber.*, 1908, 41, 4388.**Guanine** (2-Aminohypoxanthine, 6-hydroxy-2-amino-purine)
 $\text{C}_5\text{H}_5\text{ON}_5$ MW, 151
Occurs in guano, human faeces, etc. Cryst. Insol. H_2O . Heat of comb. 586.6 Cal. HCl + $\text{KClO}_3 \rightarrow$ guanidine + parabanic acid.*B, HBr*, 2 $\frac{1}{2}$ H_2O : m.p. 180°.

Acetyl deriv. : m.p. above 260°.

Propionyl deriv. : m.p. above 260°.

Picrate : decomp. at 190°.

Hoppe-Seyler, Schmidt, *Z. physiol. Chem.*, 1928, 175, 304.Fischer, *Ber.*, 1897, 30, 2251.Levene, *Biochem. Z.*, 1907, 4, 320.**Guanosine** (*Vernine, guanine riboside*)
 $\text{C}_{10}\text{H}_{13}\text{O}_5\text{N}_5$ MW, 273
Occurs in leaves and unripe berries of coffee plant. Needles from hot H_2O . M.p. 230-5° decomp. Spar. sol. H_2O . Hyd. \rightarrow guanine + ribofuranose.

Tetra-Me deriv. : hydrochloride, decomp. at 98°.

Triacetyl deriv. : m.p. 226°.

Levene, Tipson, *J. Biol. Chem.*, 1932, 97, 491.Thannhauser, Topfmüller, *Z. physiol. Chem.*, 1917, 100, 121.Levene, Clark, *J. Biol. Chem.*, 1921, 46, 19.**Guanylglycine.**

See Glycocyamine.

Guanylguanidine.

See Diguamide.

Guanylhypazine.

See Aminoguanidine.

Guanylic Acid (*Guanosine phosphoric acid*)
 $\text{C}_{10}\text{H}_{14}\text{O}_8\text{N}_5\text{P}$ MW, 363
A nucleic acid occurring in yeast. Needles + 2 H_2O . M.p. 208° decomp. $[\alpha]_D^{20} - 7.5^\circ$ in H_2O . $k_1 = 4.45 \times 10^{-3}$, $k_2 = 8.2 \times 10^{-7}$, $k_3 = 2.0 \times 10^{-10}$.Brucine salt : m.p. 233° decomp. $[\alpha]_D^{20} - 26.0^\circ$ in EtOH.Aq.

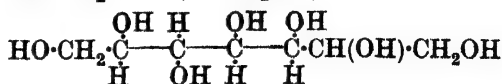
Di-brucine salt : m.p. 203°.

Peiser, *Ber.*, 1925, 58, 2051.Levene, *J. Biol. Chem.*, 1919, 40, 171; 1920, 41, 483.Read, *J. Biol. Chem.*, 1917, 31, 47.**Guanylurea.**

See Carbamylguanidine.

Guäthol.

See under Catechol.

Guloheptitol (*Guloheptite*)
 $\text{C}_7\text{H}_{16}\text{O}_7$ MW, 212
 α -.Identical with β -galaheptitol, *q.v.*

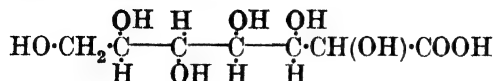
β -.

Cryst. from EtOH.Aq. M.p. 128-9°.

Benzylidene : m.p. 260° decomp.

La Forge, *J. Biol. Chem.*, 1920, **41**, 251.

***d*-Guloheptonic Acid**



$\text{C}_7\text{H}_{14}\text{O}_8$

MW, 226

α -.

Non-cryst. syrup. Heat \longrightarrow lactone.

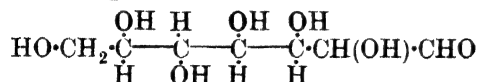
Phenylhydrazide : needles. M.p. 191-2°. $[\alpha]_D^{20}$ - 15.4°.

β -.

Non-cryst. syrup. Heat \longrightarrow lactone.

See previous reference.

***d*-Guloheptose**



$\text{C}_7\text{H}_{14}\text{O}_7$

MW, 210

α -.

Cryst. from EtOH.Aq. M.p. 185-7°. Sol. 2 parts hot H_2O or 10 parts 60% EtOH. $[\alpha]_D^{20}$ - 65.6° (final) in H_2O .

β -.

Syrup.

See previous reference.

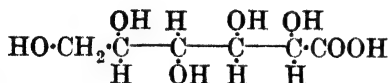
Gulonic Acid

$\text{C}_6\text{H}_{12}\text{O}_7$

MW, 196

The free acid by evaporation of the aq. sol. \longrightarrow the lactone. $\text{HNO}_3 \longrightarrow$ saccharic acid.

d-.



$[\alpha]_D^{20}$ - 1.6° (- 5.6°) in H_2O .

Amide : $\text{C}_6\text{H}_{13}\text{O}_6\text{N}$. MW, 195. M.p. 122-3°. $[\alpha]_D^{20}$ + 15.2°.

Phenylhydrazide : m.p. 147-9° (142-4° decomp.). $[\alpha]_D^{20}$ + 13.45° ($[\alpha]_D^{16}$ + 30.6°).

Ca salt : $(\text{C}_6\text{H}_{11}\text{O}_7)_2\text{Ca}$. $[\alpha]_D^{21}$ - 14.5° in H_2O .

γ -*Lactone* : $\text{C}_6\text{H}_{10}\text{O}_6$. MW, 178. Plates or prisms from H_2O . M.p. 180-1°. $[\alpha]_D^{20}$ + 55° in H_2O .

l-.

Phenylhydrazide : m.p. 147-8°, decomp. at 195°.

Benzylidene-hydrazide : spangles. M.p. 173°, decomp. at 183°. $[\alpha]_D^{17}$ - 11.2° in Py.

p-*Bromophenylhydrazide* : m.p. 153°.

Ca salt, $3\frac{1}{2}\text{H}_2\text{O}$: needles. Sol. 5.8 parts (anhyd. salt) in 100 parts H_2O at 15°.

γ -*Lactone* : prisms from hot H_2O or 60% EtOH. M.p. 185° (sinters at 179°). $[\alpha]_D^{20}$ - 55° in H_2O .

dl-.

$k = 2.1 \times 10^{-4}$ at 25° (corr. for activity).

Phenylhydrazide : m.p. 153-5°.

Ca salt : cryst. + $x\text{H}_2\text{O}$. Fine needles. Sol. 1.6 parts (anhyd. salt.) in 100 parts H_2O at 15°.

Fischer, Curtiss, *Ber.*, 1892, **25**, 1025.

Weerman, *Rec. trav. chim.*, 1917, **37**, 34.

La Forge, *J. Biol. Chem.*, 1918, **36**, 347;

U.S.P., 1,285,248, (*Chem. Abstracts*, 1919, **13**, 230).

van Marle, *Rec. trav. chim.*, 1920, **39**, 549.

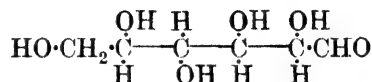
Levene, *J. Biol. Chem.*, 1924, **59**, 123; 1925, **65**, 31.

Gulose

$\text{C}_6\text{H}_{12}\text{O}_6$

MW, 180

d-.



Syrup. Non-fermentable. (α). $[\alpha]_D^{20}$ + 61.6°. Forms cryst. add. comp. with CaCl_2 , $\text{C}_6\text{H}_{12}\text{O}_6\cdot\text{CaCl}_2\cdot\text{H}_2\text{O}$, which has $[\alpha]_D^{20}$ + 37.7° (initial) and shows mutarotation.

Methylguloside : (α). + $1\text{H}_2\text{O}$. M.p. 77° decomp. $[\alpha]_D^{20}$ + 109°. (β). M.p. 176°. $[\alpha]_D^{20}$ - 83°.

Osazone : m.p. 168°, decomp. at 180°. $[\alpha]_D^{20}$ + 0.5° (final) in EtOH-Py.

l-.

Syrup. $[\alpha]_D$ - 20.4°. Red. \longrightarrow *l*-sorbitol. $\text{Ba}(\text{OH})_2 \longrightarrow$ *l*-sorboside (in part). Does not ferment with yeast.

Phenylhydrazone : m.p. 143°.

Osazone : m.p. 156°.

dl-.

Syrup.

Phenylhydrazone : m.p. 143°.

Osazone : m.p. 157-9°.

Blanksma, Ekenstein, *Chem. Zentr.*, 1908, **II**, 1583.

Levene, La Forge, *J. Biol. Chem.*, 1915, **20**, 430.

Talen, *Rec. trav. chim.*, 1925, **44**, 891.

Isbell, *J. Am. Chem. Soc.*, 1933, **55**, 2167;

Chem. Abstracts, 1931, **25**, 1223; 1930, **24**, 2726.

See also first reference above.

Gurjunene

$C_{15}H_{24}$ MW, 204

Tricyclic terpene from gurjun balsam.

(α). B.p. 114–16°/10 mm. D_{20}^{20} 0.918. n_D^{20} 1.501. $[\alpha]_D^{20} - 110^\circ$.

(β). B.p. 120–3°/13 mm. D_{20}^{20} 0.9348. n_D^{20} 1.50275. $[\alpha]_D^{20} + 74.5^\circ$.

An isomeric hydrocarbon regenerated from the hydrochloride of gurjunene has b.p. 123–9°, D_4^{25} 0.9233, n_D^{15} 1.5105, $[\alpha]_D^{15} - 39.0^\circ$, and is probably a hydronaphthalene deriv.

Ruzicka, Pontalti, Balas, *Helv. Chim. Acta*, 1923, 6, 855.

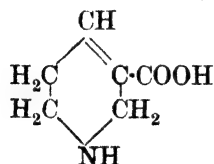
Gurjuresene

$C_{17}H_{28}O_2$ MW, 264

Resin-acid from gurjun balsam. M.p. 40–3°.

Tschirch, Weil, *Arch. Pharm.*, 1903, 241, 372.

Guvacine (Δ^3 -Tetrahydropyridine-3-carboxylic acid, Δ^3 -tetrahydronicotinic acid)



$C_6H_9O_2N$ MW, 127

Short rods + $1H_2O$ from EtOH.Aq. Decomp. at 285°.

Me ester: guvacoline. $C_7H_{11}O_2N$. MW, 141. M.p. 27°. B.p. 114°/14 mm. *Hydrochloride*: m.p. 121–2°. B_2, H_2PtCl_6 : m.p. 211° decomp.

B, HCl: decomp. at 316°.

B, H, AuCl_4: m.p. 197–9° decomp.

B_2, H_2PtCl_6: m.p. 220–1° decomp.

p-Toluenesulphonyl: m.p. 167–8°.

N-Me: see Arecaidine.

Freudenberg, *Ber.*, 1918, 51, 818.

Hess, Leibbrandt, *Ber.*, 1919, 52, 206.

Guvacoline.

See under Guvacine.

Gynocardic Acid

$C_{17}H_{33}COOH$

$C_{18}H_{34}O_2$ MW, 282

Constituent of chaulmoogra oil. Leaflets from EtOH. M.p. 67.5°. Readily sol. most org. solvents. Has therapeutic value in treatment of tuberculosis and leprosy.

Cu salt: two forms. (α) M.p. 70°. Partially converted to β -form on heating in solution. (β) High m.p. Probably polymer of the α -form.

Me ester: $C_{19}H_{36}O_2$. MW, 296. Fluorescent oil. B.p. 320–30°.

Cholesteryl ester: m.p. 110–12°. *Tetrabromide*: m.p. 77–8°.

Ostromuiskenskii, Bergman, *J. Russ. Phys. Chem. Soc.*, 1915, 47, 318, (*Chem. Abstracts*, 1916, 10, 44).

Cf. Schöbl, Perkins, Cruz, *Chem. Abstracts*, 1924, 18, 1155. Rock, Fairchild, Power, *Chem. Abstracts*, 1922, 16, 2197. Gardner, *Pharm. J.*, 1922, 109, 154. Rakuzin, Flier, *Chem. Abstracts*, 1916, 10, 1521.

Gynocardin

$C_{13}H_{19}O_9N$ MW, 333

Cyanogenetic β -glucoside from *Gynocardia odorata*, R.Br., and *Pangium edule*, Reinw. Glistening prismatic needles + $1\frac{1}{2}H_2O$ from H_2O . M.p. 162–3° (anhyd.) slight decomp. Sol. hot EtOH. Very spar sol. other org. solvents. Feebly acidic. $[\alpha]_D^{21} + 72.5^\circ$ in H_2O . NaOEt or NaOH in EtOH \rightarrow white solid, $C_{13}H_{18}O_9NNa$. Hot $Ba(OH)_2$.Aq. \rightarrow gynocardinic acid + NH_3 .

Hepta-acetyl deriv.: needles. M.p. 118–19°. $[\alpha]_D^{21} + 40.4^\circ$ in $CHCl_3$.

Moore, Tutin, *J. Chem. Soc.*, 1910, 97, 1285.

Cf. Brill, *Chem. Abstracts*, 1917, 11, 3381.

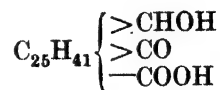
Gynocardinic Acid

$C_{12}H_{19}O_9COOH$

$C_{13}H_{20}O_{11}$ MW, 352

Hydrolysis product of gynocardin. Syrup. Dextrorotatory. Does not reduce Fehling's. Forms cryst. Ba salt. Hot dil. $H_2SO_4 \rightarrow$ glucose + a carboxylic acid (*quinine salt*: m.p. 224° decomp.).

Power, Lees, *J. Chem. Soc.*, 1905, 87, 349.

Gypsogenin

$C_{28}H_{44}O_4$ MW, 444

Polyterpenoid saponenin from *Gypsophila* and other species of *Saponaria*. Needles from EtOH. M.p. 275° (sinters at 250°). Spar. sol. hot EtOH. H (+Pt) in EtOH \rightarrow dihydro-comp., m.p. 321–2°. Se \rightarrow 2:7-dimethylnaphthalene + 1:2:7-trimethylnaphthalene (sapotalin).

Acetyl deriv.: m.p. 192–4° (sinters at 178°).

Me ester: $C_{28}H_{46}O_4$. MW, 458. Needles from EtOH. M.p. 192° (foams at 140°).

Oxime: decomp. at 264–5° (turns brown at 250°).

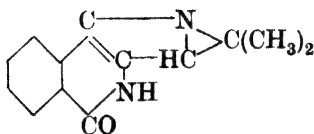
Semicarbazone: m.p. 272°.

Ruzicka *et al.*, *Helv. Chim. Acta*, 1932, 15, 1496.

Karrer *et al.*, *Helv. Chim. Acta*, 1924, 7, 784.

van der Haar, *Rec. trav. chim.*, 1927, 46, 85.

Gyrlone



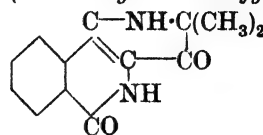
$C_{13}H_{12}ON_2$

MW, 212

Silky needles from H_2O . M.p. 212° (reddens). Mod. sol. hot EtOH. Spar. sol. boiling H_2O . Sol. alkalis. Forms cryst. salts with hydrochloric, chloroauric, chloroplatinic, and chromic acids. Fuming HCl in sealed tube at 135° → compound, yellow leaflets from EtOH, m.p. above 300° decomp.; sublimes; isomeric with gyrolone.

Gabriel, *Ber.*, 1911, 44, 90.

Gyrolone (1 : 3-Dihydro-3-ketogyrlone)



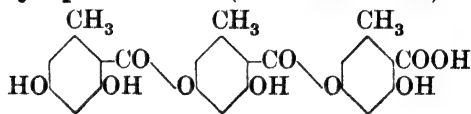
$C_{13}H_{12}O_2N_2$

MW, 228

Yellow rhombic and quadratic cryst. from hot H_2O . M.p. 303° (blackens). Sol. alkalis. Insol. NH_3 . Aq. H_2O sols fluor. bluish-green. Conc. H_2SO_4 → malachite-green col., H_2O → blue ppt.

Gabriel, *Ber.*, 1911, 44, 84.

Gyrophoric Acid (Triorsellinic acid)



$C_{24}H_{20}O_{10}$

MW, 468

Occurs in lichens. Cryst. from Me_2CO . M.p. 220°. Sol. EtOH, Me_2CO . Spar. sol. Et_2O . C_6H_6 , $CHCl_3$, AcOH.

Tetra-Me ether Me ester: $C_{29}H_{30}O_{10}$. MW, 538. M.p. 196–7°.

Tetra-acetyl: m.p. 228°.

Tetra-chloroacetyl: m.p. 163–4°.

Quinine salt: m.p. 162°.

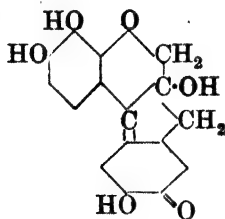
Asahina, Watanabe, *Ber.*, 1930, 63, 3044.

H

H Acid.

See 1-Amino-8-naphthol-3 : 6-disulphonic Acid.

Hæmatein



$C_{16}H_{12}O_6$

MW, 300

Brownish-red needles from EtOH.Aq. M.p. above 200°. Spar. sol. H_2O , AcOEt. Insol. $CHCl_3$, C_6H_6 . Sol. conc. H_2SO_4 → brownish-violet sol. Gives salts with heavy metals.

Tetra-Me ether: $C_{20}H_{20}O_6$. MW, 356. M.p. 210°.

Perkin, Robinson, *J. Chem. Soc.*, 1908, 93, 1121.

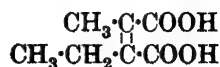
Bollina, Kostanecki, Tambor, *Ber.*, 1902, 35, 1678.

Hummel, Perkin, *Ber.*, 1882, 15, 2337.

Hæmatin.

See under Hæmin.

dibasic-Hæmatinic Acid (β -Amylene- β : γ -dicarboxylic acid, 1-methyl-2-ethylmaleic acid, 2-pentene-2 : 3-dicarboxylic acid, 1-methyl-2-butyl-ene-2 : 3-dicarboxylic acid)



$C_7H_{10}O_4$

MW, 158

Exists only in form of salts. Anhydride and imide produced by oxidation of hæmin, etc.

Di-Me ester: $C_9H_{14}O_4$. MW, 186. B.p. 235°.

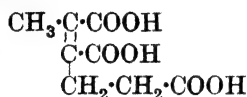
Anhydride: $C_7H_8O_3$. MW, 140. B.p. 230°.

Imide: C_7H_8ON . MW, 123. M.p. 67° (72°).

Kuster, *Ann.*, 1901, 315, 207.

Kuster, Galler, *Ann.*, 1906, 345, 16.

tribasic-Hæmatinic Acid (β -Amylene- β : γ : ϵ -tricarboxylic acid, 2-pentene-2:3:5-tricarboxylic acid, 1-methyl-1-butylene-1:2:4-tricarboxylic acid)



$C_8H_{10}O_6$ MW, 202

Exists only in form of salts. Anhydride and imide produced by oxidation of hæmin, bilirubin, etc.

Mono-Me ester: $C_9H_{12}O_6$. MW, 216. B.p. 173-6°/11 mm.

Tri-Me ester: $C_{11}H_{16}O_6$. MW, 244. B.p. 300-1°, 165-7°/10 mm.

Mono-Et ester: $C_{10}H_{14}O_6$. MW, 230. B.p. 165°/10 mm. *Amide*: m.p. 105-10°.

Di-Et ester: $C_{12}H_{18}O_6$. MW, 258. B.p. 179-80°/15 mm.

Tri-Et ester: $C_{14}H_{22}O_6$. MW, 286. B.p. 191°/17 mm.

Anhydride: $C_8H_8O_5$. MW, 184. M.p. 97°.

Imide: $C_8H_8O_4N$. MW, 183. M.p. 114-15°.

Fischer, Nenitzescu, *Z. physiol. Chem.*, 1925, 145, 295.

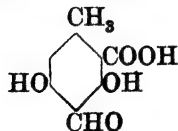
Kuster, Weller, *Ber.*, 1914, 47, 532.

See also above references.

Hæmatoidine.

See Bilirubin.

Hæmatommic Acid (3:5-Dihydroxy-4-aldehydo-o-toluic acid, 4-aldehydo-orsellinic acid)



$C_9H_8O_5$ MW, 196

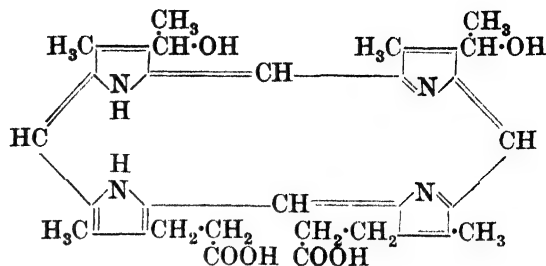
Constituent of *Hæmatomma coccineum*. Needles from AcOH. M.p. 172-3°. Depside with β -orcinol-carboxylic acid methyl ester is atranorin, *q.v.*

Me ester: $C_{10}H_{10}O_5$. MW, 210. M.p. 147°.

Et ester: $C_{11}H_{12}O_5$. MW, 224. M.p. 113°.

St. Pfau, *Helv. Chim. Acta*, 1933, 16, 282.

Hæmatoporphyrin



$C_{34}H_{38}O_6N_4$ MW, 598

Deep red cryst. Sol. EtOH. Spar. sol. Et₂O, CHCl₃. Insol. H₂O, AcOH.Aq. Obtained from hæmin and hæmatin by removal of Fe by conc. acids. $\text{HI} + \text{PH}_4\text{I} \rightarrow \text{hæmopyrrole}$.

Di-Me ester: $C_{36}H_{42}O_6N_4$. MW, 626. M.p. 212°.

Tetra-Me deriv.: m.p. 120°.

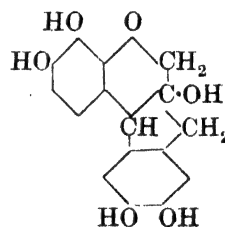
Tetra-Et deriv.: m.p. 149°.

Fischer et al., *Z. physiol. Chem.*, 1929, 185, 33.

Fischer, Zeile, *Ann.*, 1929, 468, 112.

Treibs, *Angew. Chem.*, 1934, 47, 294 (Bibl.).

Hæmatoxylin



$C_{16}H_{14}O_6$ MW, 302

Constituent of *Hæmatoxylin campechianum*. Prisms + 3H₂O from EtOH. M.p. 100-120°. Sol. EtOH, Et₂O. Spar. sol. H₂O. Sol. NH₃ \rightarrow purple sol. Ox. \rightarrow hæmatein. KOH fusion \rightarrow pyrogallol. Forms salts with heavy metals.

Penta-acetyl: m.p. 165-6°.

Tetra-Me ether: $C_{20}H_{22}O_6$. MW, 358. M.p. 139-40°. *Acetyl*: m.p. 178-80°.

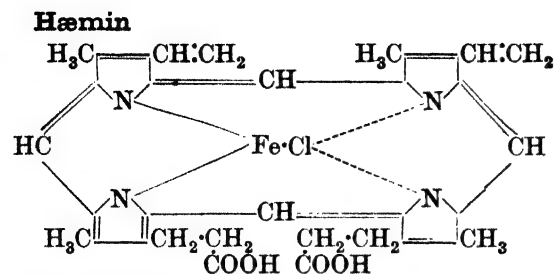
Penta-Me ether: $C_{21}H_{24}O_6$. MW, 372. M.p. 144-7°.

Dibromide: m.p. 120° decomp.

Perkin, Robinson, *J. Chem. Soc.*, 1908, 93, 496, 1121.

Herzig, *Monatsh.*, 1898, 16, 906.

Bolling, Kostanecki, Tambor, *Ber.*, 1902, 35, 1678.



$C_{34}H_{32}O_4N_4ClFe$ MW, 651.5

Bluish-black microscopic rhombohedra. Sol. AcOH, Insol. H_2O , EtOH, Et_2O , $CHCl_3$. Obtained by ox. of blood in presence of NaCl (Teichmann's reaction). Conc. acids \rightarrow hæmatoporphyrin. Ox. in absence of NaCl \rightarrow hæmatin, the Cl-free compound: $C_{34}H_{33}O_5N_4Fe$, blue-black cryst., decomp. at 200° without melting. Insol. H_2O , EtOH, Et_2O .

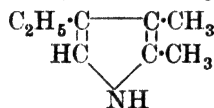
Fischer, Zeile, *Ann.*, 1929, **468**, 112.

Fischer, Stangler, *Ann.*, 1927, **459**, 53.

Treibs, *Angew. Chem.*, 1934, **47**, 294 (Bibl.).

Cambi, Szegli, *Chem. Zentr.*, 1934, II, 2681.

Hæmopyrrole (2 : 3-Dimethyl-4-ethylpyrrole)



$C_8H_{13}N$ MW, 123

Obtained from hæmatoporphyrin by treatment with HI + PH_4I . B.p. $113^\circ/16$ mm.

Picrate : m.p. 123° (108°).

Fischer, Klarer, *Ann.*, 1926, **450**, 187, 198.

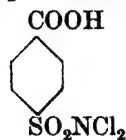
Knorr, Hess, *Ber.*, 1912, **45**, 2626 (Bibl.).

Fischer, Bartolomäus, *Ber.*, 1912, **45**, 1979.

Hæmopyrrole-C.

See Cryptopyrrole.

Halazone (p-Sulphondichloroaminobenzoic acid, benzoic acid-p-N-dichlorosulphonamide)



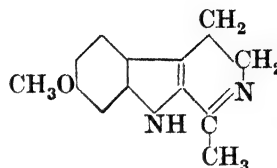
$C_7H_5O_4NCl_2S$ MW, 270

Prisms from AcOH. M.p. 213° . Spar. sol. H_2O , $CHCl_3$. Insol. pet. ether. Sol. alkalis, reprecipitated by acids. Explodes on rapid heating on Pt foil. Hyd. by phosphates, and borates. Powerful germicide. Used for sterilisation of drinking water.

Et ester : $C_9H_9O_4NCl_2S$. MW, 298. Prisms from CCl_4 . M.p. 80° .

Dakin, Dunham, *British Medical Journal*, 1917, I, 683.

Harmaline (Dihydroharmine)



$C_{13}H_{14}ON_2$ MW, 214

Constituent of *Peganium harmala*. Prisms from EtOH. M.p. 250° decomp. Sol. EtOH. Spar. sol. H_2O , Et_2O . Optically inactive. Boiling HCl \rightarrow harmalol.

B.HCl : m.p. 212° .

N-Acetyl : m.p. $204-5^\circ$.

Methiodide : m.p. 260° .

Methosulphate : m.p. $170-2^\circ$.

Benzylidene deriv. : m.p. 245° .

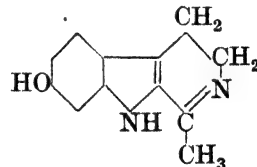
Späth, Lederer, *Ber.*, 1930, **63**, 120.

Manske, Perkin, Robinson, *J. Chem. Soc.*, 1927, 1.

Perkin, Robinson, *J. Chem. Soc.*, 1919, **115**, 933.

Fischer, *Ber.*, 1897, **30**, 2483.

Harmalol



$C_{12}H_{12}ON_2$ MW, 200

Constituent of *Peganium harmala*. Needles + $3H_2O$ from H_2O . M.p. 212° decomp. Sol. Me_2CO , $CHCl_3$, hot H_2O . Spar. sol. C_6H_6 . Unstable in air.

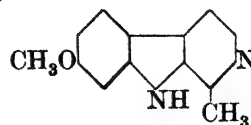
Me ether : see Harmaline.

See previous references.

Harman.

See Aribine.

Harmine



$C_{13}H_{12}ON_2$ MW, 212

Constituents of *Peganium harmala*. Prisms

from MeOH. M.p. 257–9° (264–5°). Spar. sol. H₂O, EtOH, Et₂O. Optically inactive. Salts show deep blue fluor. in sol. Boiling HCl → harmol, C₁₂H₁₀ON₂, m.p. 321°.

B,HCl: m.p. 321°.

Methiodide: m.p. 305–7°.

Methosulphate: m.p. 220°.

Benzylidene deriv.: m.p. 191–2°.

Späth, Lederer, *Ber.*, 1930, **63**, 120.

Manske, Perkin, Robinson, *J. Chem. Soc.*, 1927, **1**.

Perkin, Robinson, *J. Chem. Soc.*, 1919, **115**, 933.

Fischer, *Ber.*, 1897, **30**, 2483.

Harmol.

See under Harmine.

Hederagenolic Acid.

See under Hederagenin.

Hederagenin

C₃₀H₄₈O₄ MW, 472

Cryst. from EtOH. M.p. 327–9°. Sol. EtOH, Py. Spar. sol. most org. solvents. Insol. H₂O. $[\alpha]_D^{21} + 70.1^\circ$ in CHCl₃-MeOH. Ox. → hederagenolic acid, m.p. 230°.

Mono-acetyl: m.p. 156°.

Diacetyl: m.p. 160–80°.

Me ester: C₃₁H₅₀O₄. MW, 486. M.p. 240°. $[\alpha]_D^{18} + 70.9^\circ$. *Diacetyl*: cryst. + 1H₂O. M.p. 193°. $[\alpha]_D^{18} + 61.8^\circ$.

Ester: C₃₂H₅₂O₄. MW, 500. M.p. 218–19°. $[\alpha]_D^{18} + 72.5^\circ$. *Diacetyl*: m.p. 150°. $[\alpha]_D^{18} + 76.47^\circ$.

Amide: C₃₀H₄₉O₃N. MW, 471. M.p. 285°.

Lactone: m.p. 354°. $[\alpha]_D^{19} + 16.5^\circ$ in CHCl₃.

Acetyl: m.p. 244°.

Phenylurethane: m.p. 155–8°.

Winterstein, Stein, *Z. physiol. Chem.*, 1932, **211**, 5.

Jacobs, *J. Biol. Chem.*, 1925, **63**, 621.

van der Haar, Tamburello, *Ber.*, 1921, **54**, 3148.

Kitasato, *Chem. Abstracts*, 1935, **29**, 469.

Hederin

C₄₁H₆₄O₁₁ MW, 732

Widely distributed saponin. First isolated from *Hedera Helix*. Needles from EtOH-pet. ether. M.p. 256–7°. Sol. EtOH, Me₂CO, AcOEt. Insol. Et₂O, pet. ether. $[\alpha]_D^{19} - 9.68^\circ$. Sol. dil. alkalis. Not pptd. by cholesterol. Hyd. → hederagenin, arabinose, and rhamnose.

Me ester: C₄₂H₆₆O₁₁. MW, 746. M.p. 199–200°.

van der Haar, *Arch. Pharm.*, 1913, **251**, 632.

Ruzicka, Veen, *Z. physiol. Chem.*, 1929, **184**, 69.

See also previous references.

Hedonal.

See under Carbamic Acid.

Helenien

C₇₂H₁₁₆O₄ MW, 1044

Pigment of *Helenium autumnale*, Tagetes. Dipalmitate of lutein. Deep red needles from EtOH. M.p. 92°. Absorption bands in CS₂, 511, 478, 466 mμ. Hyd. → lutein + palmitic acid.

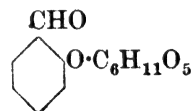
Kuhn, Winterstein, Lederer, *Z. physiol. Chem.*, 1931, **197**, 150.

Winterstein, *Angew. Chem.*, 1934, **47**, 315.

Helenine.

See Alantolactone.

Helicin (Salicylaldehyde glucoside, glucosido-salicylaldehyde)



C₁₃H₁₆O₇ MW, 284

Obtained from salicin by ox. with HNO₃. Needles from H₂O. M.p. 174–5°. Sol. H₂O, EtOH, hot Et₂O. Spar. sol. Et₂O. $[\alpha]_D^{20} - 60.43^\circ$. Hyd. → salicylaldehyde + glucose. Red. → salicin. Sol. conc. H₂SO₄ → red sol. Hyd. by emulsin.

Michael, *Am. Chem. J.*, 1879, **1**, 309.

Schiff, *Ann.*, 1870, **154**, 19.

Heliotridine.

See under Heliotrine.

Heliotrine

C₁₆H₂₇O₅N MW, 313

Alkaloid from *Heliotropium lasiocarpum*. Prisms from Me₂CO. M.p. 125–6°. Sol. H₂O, EtOH, CHCl₃. Spar. sol. Et₂O, pet. ether. $[\alpha]_D^{20} - 3.75^\circ$. Hyd. → heliotrinic acid, m.p. 92–4°, and heliotridine, m.p. 116–18°, $[\alpha]_D^{20} + 31^\circ$. *Methiodide*: m.p. 108–11°.

Menschikoff, *Ber.*, 1932, **65**, 974.

Heliotrinic Acid.

See under Heliotrine.

Heliotropin.

See Piperonal.

Helleborein $C_{37}H_{56}O_{18}$

MW, 788

Glucoside from *Helleborus niger*. Needles from EtOH. M.p. 270°. $[\alpha]_D^{25} - 2.8^\circ$. Hyd. \rightarrow helleboretin (m.p. above 200°), acetic acid, glucose, and arabinose. Toxic.

Acetyl: m.p. 129–30°.

Benzoyl: m.p. 142°.

Sieburg, *Arch. Pharm.*, 1913, 251, 154.Thaeter, *Arch. Pharm.*, 1897, 235, 414.**Helleboresin.**

See under Helleborin.

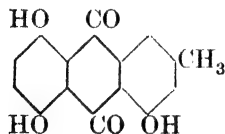
Helleboretin.

See under Helleborein.

Helleborin $C_{28}H_{36}O_6$

MW, 468

Constituent of *Helleborus viridus* and *H. niger*. M.p. above 250°. Sol. $CHCl_3$. Spar. sol. Et_2O . Insol. H_2O , EtOH. Hyd. \rightarrow helleboresin (m.p. 140–50°) and glucose. Toxic.

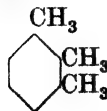
Keller, Schöbel, *Arch. Pharm.*, 1928, 266, 545.**Helminthosporin** (4 : 5 : 8-Trihydroxy-2-methylantraquinone) $C_{15}H_{10}O_5$

MW, 270

Pigment of *Helminthosporium gramineum*. Maroon needles from $CHCl_3$. M.p. 225–6°. Spar. sol. EtOH, Et_2O , Me_2CO , AcOH. Sols. are orange-red with green fluor. Zn dust dist. \rightarrow 2-methylanthrane.

Triacetyl: $C_{21}H_{16}O_8$. MW, 396. M.p. 223–4°.Charles, Raistrick, Robinson, Todd, *Biochem. J.*, 1933, 27, 499.**Hemellitic Acid.**

See 2 : 3-Dimethylbenzoic Acid.

Hemimellitene (1 : 2 : 3-Trimethylbenzene, vicinal-trimethylbenzene, hemimellitene) C_9H_{12}

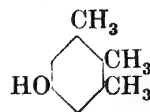
MW, 120

M.p. -15° . B.p. 175–6°. $D^{20}_D 0.895$. $n^{20}_D 1.513$.

Picrate: m.p. 89–5°.

Auwers, *Ann.*, 1919, 419, 116.

Dict. of Org. Comp.—II.

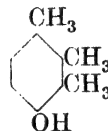
sym.-Hemimellitenol (3 : 4 : 5-Trimethylphenol, 5-hydroxyhemimellitene) $C_9H_{12}O$

MW, 136

Needles from pet. ether with bluish fluor. M.p. 107°. B.p. 248–9°. Sol. most org. solvents.

Acetyl: m.p. 59–60°.

Phenylurethane: m.p. 148–9°.

Auwers, Wieners, *Ber.*, 1925, 58, 2815.Auwers, Sauerwein, *Ber.*, 1922, 55, 2372.**unsym.-Hemimellitenol** (vicinal-Hemimellitenol, 2 : 3 : 4-trimethylphenol, 4-hydroxyhemimellitene) $C_9H_{12}O$

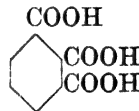
MW, 136

Needles from pet. ether. M.p. 81°. B.p. 235–7°. Sol. most org. solvents.

Acetyl: b.p. 239–41°.

Phenylurethane: m.p. 127°.

See above references.

Hemimellitic Acid (Benzene-1 : 2 : 3-tricarboxylic acid) $C_9H_6O_6$

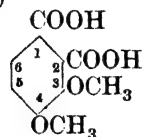
MW, 210

Needles from H_2O . M.p. 190°. Sol. H_2O . Spar. sol. Et_2O . Insol. conc. HCl. $D^{20}_D 1.546$.

2-Me ester: $C_{10}H_8O_6$. MW, 224. M.p. 203–5°.1 : 3-Di-Me ester: $C_{11}H_{10}O_6$. MW, 238. M.p. 148–50°. Chloride: m.p. 84–7°.Tri-Me ester: $C_{12}H_{12}O_6$. MW, 252. M.p. 102°.Tri-Et ester: $C_{15}H_{18}O_6$. MW, 294. M.p. 39°.Anhydride: $C_9H_6O_5$. MW, 192. M.p. 310° decomp. \rightarrow phthalic anhydride.Imide: $C_9H_5O_4N$. MW, 191. M.p. 247°.Graebe, Leonhardt, *Ann.*, 1896, 290, 226.**Hemipic Acid.**

See Hemipinic Acid.

Hemipinic Acid (3 : 4-Dimethoxyphthalic acid, hemipic acid)



$C_{10}H_{10}O_6$

MW, 226

Needles + $2H_2O$. M.p. 177° (181°). Sol. EtOH, AcOH. Spar. sol. Et_2O , C_6H_6 . Heat of comb. C_p 102.4 Cal. $k = 1.1 \times 10^{-3}$ at 25° . $FeCl_3$.Aq. \rightarrow yellow sol. HCl \rightarrow isovanillic acid + protocatechuic acid. Hot conc. $H_2SO_4 \rightarrow$ 1 : 2 : 5 : 6-tetrahydroxyanthraquinone.

1-Me ester: $C_{11}H_{12}O_6$. MW, 240. M.p. 138° .

2-Me ester: exists in two forms. Labile: cryst. from H_2O . M.p. $96-8^\circ$. Stable: cryst. from Et_2O . M.p. 138° .

Di-Me ester: $C_{12}H_{14}O_6$. MW, 254. M.p. $61-2^\circ$. B.p. $207^\circ/16.5$ mm.

1-Et ester: $C_{12}H_{14}O_6$. MW, 254. M.p. $147-9^\circ$.

2-Et ester: m.p. 145° .

Di-Et ester: $C_{14}H_{18}O_6$. MW, 282. M.p. 72° .

1-Amide: $C_{10}H_{11}O_5N$. MW, 225. M.p. 142° .

2-Me ester: m.p. $173-4^\circ$. 2-Et ester: m.p. $180-1^\circ$.

2-Amide: m.p. 162° .

Anhydride: $C_{10}H_8O_5$. MW, 208. M.p. $166-7^\circ$.

Imide: $C_{10}H_9O_4N$. MW, 207. M.p. 230° .

1-Nitrile: $C_{10}H_9O_4N$. MW, 207. M.p. 82° .

2-Nitrile: m.p. $207-8^\circ$.

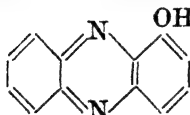
Goldschmiedt, *Monatsh.*, 1888, **9**, 769.

Pschorr, Sumuleanu, *Ber.*, 1899, **32**, 3411.

Perkin, *J. Chem. Soc.*, 1916, **109**, 921.

Hoogewerff, van Dorp, *Rec. trav. chim.*, 1895, **14**, 273.

Hemipyrocyanine (1-Hydroxyphenazine)



$C_{12}H_8ON_2$

MW, 196

M.p. 158° . Sol. Py, phenol. Spar. sol. H_2O , EtOH, $CHCl_3$.

Acetyl: m.p. 120° .

Benzoyl: m.p. 173° .

Wrede, Strack, *Z. physiol. Chem.*, 1928, **177**, 177.

Hemisine.

See Adrenaline.

Hendecane.

See Undecane.

Heneicosandiol-3 : 6 (3 : 6-Dihydroxyheneicosane, 1-ethyl-4-pentadecyl-tetramethyleneglycol)
 $CH_3 \cdot [CH_2]_{14} \cdot CH(OH) \cdot [CH_2]_2 \cdot CH(OH) \cdot CH_2 \cdot CH_3$

$C_{21}H_{44}O_2$

MW, 328

Cryst. from EtOH. M.p. 95° .

Diacetyl: m.p. 48° .

Helferich, Köster, *Ber.*, 1923, **56**, 2094.

Heneicosane



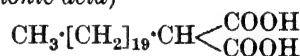
$C_{21}H_{44}$

MW, 296

White wax. M.p. 40.5° . B.p. $215^\circ/15$ mm. D^{40}_D 0.778.

Krafft, *Ber.*, 1882, **15**, 1718.

Heneicosane-1 : 1-dicarboxylic Acid
 (Eicosylmalonic acid)



$C_{23}H_{44}O_4$

MW, 384

M.p. 119° . Spar. sol. $CHCl_3$. Evolves CO_2 at 150° .

Mono-nitrile: $C_{23}H_{43}O_2N$. MW, 365. M.p. $87-9^\circ$.

Fileti, *Gazz. chim. ital.*, 1910, **27**, 302.

Heneicosane-1 : 21-dicarboxylic Acid



$C_{23}H_{44}O_4$

MW, 384

Occurs as esters in Japan wax. Needles from $CHCl_3$. M.p. 127.5° . Spar. sol. org. solvents.

Me ester: $C_{24}H_{46}O_4$. MW, 398. M.p. 87° .

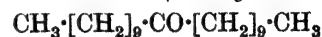
Di-Me ester: $C_{25}H_{48}O_4$. MW, 412. M.p. 71° .

Et ester: $C_{25}H_{48}O_4$. MW, 412. M.p. 83.5° .

Di-Et ester: $C_{27}H_{52}O_4$. MW, 440. M.p. 61.5° .

Flaschenträger, Halle, *Z. physiol. Chem.*, 1930, **190**, 120.

Heneicosanone-11 (Didecyl ketone)



$C_{21}H_{42}O$

MW, 310

Needles from EtOH.Aq. M.p. 64° .

Oxime: m.p. 27.5° .

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 57.

9-Heneicosene (1-Octyl-2-undecyl-ethylene)



$C_{21}H_{42}$

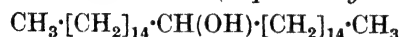
MW, 294

M.p. $+3^\circ$. B.p. $201-2^\circ/11$ mm. D^{15}_D 0.8048.

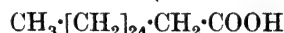
P + HI \rightarrow heneicosane.

Schaal, *Ber.*, 1907, **40**, 4787.

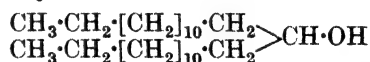
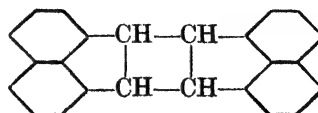
Mai, *Ber.*, 1889, **22**, 2135.

Heneicosene-carboxylic Acid.Erucic Acid and Brassidic Acid, *q.v.***Heneicosine-carboxylic Acid.**Behenolic Acid, *q.v.***Hentriacontane** $\text{C}_{31}\text{H}_{64}$ MW, 436Constituent of many waxes. Leaflets from AcOEt. M.p. 68°. Sol. pet. ether. Spar. sol. EtOH, Et₂O, AcOEt. D₂₀²⁵ 0.7808.Krafft, Weilandt, *Ber.*, 1896, **29**, 1323.Krafft, *Ber.*, 1907, **40**, 4783.Heilbron, Phipers, Wright, *J. Chem. Soc.*, 1934, 1573.**Hentriacontane-1-carboxylic Acid.***See* Lacceric Acid.**Hentriacontanol-1.***See* Melissyl Alcohol.**Hentriacontanol-16 (Dipentadecylcarbinol)** $\text{C}_{31}\text{H}_{64}\text{O}$ MW, 452Needles from EtOH. M.p. 84–5°. Sol. Et₂O, pet. ether, C₆H₆. Spar. sol. EtOH, MeOH.Kipping, *J. Chem. Soc.*, 1890, **57**, 986.**Hentriacontanone.***See* Palmitone.**Hentriacontene** $\text{C}_{31}\text{H}_{62}$ MW, 434Felted mass from Me₂CO. M.p. 64°. B.p. 295°/15 mm.

Bromide: m.p. 62°. Unstable.

Pummerer, Kranz, *Ber.*, 1929, **62**, 2625.**Heptachloroanthracene** $\text{C}_{14}\text{H}_3\text{Cl}_7$ MW, 419.5Yellow needles. M.p. above 350°. Sol. PhNO₂, ligroin. Spar. sol. CHCl₃, hot toluene. Insol. EtOH, Et₂O, AcOH, C₆H₆. Sublimes. Ox. → pentachloroanthraquinone.Diehl, *Ber.*, 1878, **11**, 176.**1 : 1 : 1 : 2 : 2 : 3 : 3-Heptachloropropane** C_3HCl_7 MW, 285.5M.p. 29.4°. B.p. 247–8°, 164°/90 mm., 150–51°/50 mm., 132°/30 mm. D₄²⁵ 1.8048. Heat at 250–420° → CCl₂·CCl:CCl₂ + HCl. Alc. KOH → hexachloropropylene.Prins, *J. prakt. Chem.*, 1914, **89**, 415.Fritsch, *Ann.*, 1897, **297**, 314.**1 : 1 : 1 : 2 : 3 : 3 : 3-Heptachloropropane** C_3HCl_7 MW, 285.5M.p. 11–11.5°. B.p. 249°, 165°/90 mm. D₄²⁵ 1.7921. n_D^{25} 1.5427. Alc. KOH → hexachloropropylene.Prins, *J. prakt. Chem.*, 1914, **89**, 417; D.R.P., 261,689, (*Chem. Zentr.*, 1913, II, 394).**Heptacosane** $\text{C}_{27}\text{H}_{56}$ MW, 380Constituent of Gedda wax and beeswax. Pearly leaflets from AcOEt. M.p. 59.5°. B.p. 270°/15 mm. Spar. sol. Et₂O. Insol. EtOH. D₂₀²⁵ 0.780. n_D^{25} 1.4345.Gluud, *Ber.*, 1919, **52**, 1051.Lipp, Casimir, *J. prakt. Chem.*, 1919, **99**, 256.**Heptacosanic Acid (Carboceric acid)** $\text{C}_{27}\text{H}_{54}\text{O}_2$ MW, 410

Present as ester in Chinese and Montan waxes. Needles from AcOEt. M.p. 82°.

Me ester: $\text{C}_{28}\text{H}_{56}\text{O}_2$. MW, 424. Cryst. from MeOH. M.p. 64°. B.p. 265–8°.Tropsch, Kreutzer, *Chem. Abstracts*, 1922, **16**, 2111.Gascard, *Compt. rend.*, 1920, **170**, 1328.**Heptacosanol-14 (14-Hydroxyheptacosane, di-n-tridecylcarbinol)** $\text{C}_{27}\text{H}_{56}\text{O}$ MW, 396Found in traces in apple skin wax. M.p. 80–1°. Very sol. CHCl₃. Sol. Me₂CO, MeOH, pet. ether, hot EtOH. Insol. H₂O.Jacobson, *J. Am. Chem. Soc.*, 1911, **33**, 2050.Grün, Ulbrich, Krczil, *Z. angew. Chem.*, 1926, **39**, 421.**Heptacosanone-14.***See* Myristone.**Heptacyclene (Di-perinaphthylencyclobutane)** $\text{C}_{24}\text{H}_{16}$

MW, 304

α -Form :

Needles from C_6H_6 . M.p. 306–7°. Sol. hot $PhNO_2$. Insol. cold conc. H_2SO_4 . $K_2Cr_2O_7$ in $AcOH \rightarrow$ naphthalic anhydride.

Picrate : m.p. 225–7° decomp.

 β -Form :

Prisms or plates from C_6H_6 . M.p. 232–4°. Sol. $CHCl_3$, C_6H_6 . Spar. sol. $EtOH$, Et_2O , $AcOH$. Sol. hot conc. H_2SO_4 . $Na_2Cr_2O_7$ in $AcOH \rightarrow$ naphthalic anhydride.

Picrate : m.p. 215–16°.

Dziwowski, Paschalski, *Ber.*, 1914, **47**, 2680.

Heptadecanal.

See Heptadecyl Aldehyde.

Heptadecane

$C_{17}H_{36}$ MW, 240

M.p. 22°. B.p. 303°, 223°/100 mm., 187·5°/30 mm., 159–63°/11 mm. $D_4^{22} 0.7777$. $n_D 1.44052$.

Semmler, Feldstein, *Ber.*, 1914, **47**, 2691.

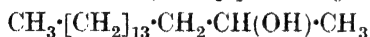
Krafft, *Ber.*, 1882, **15**, 1702.

Heptadecanoic Acid.

See Heptadecylic Acid.

Heptadecanol-1.

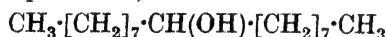
See Heptadecyl Alcohol.

Heptadecanol-2 (Methylpentadecylcarbinol)

$C_{17}H_{36}O$ MW, 272

Plates. M.p. 54°.

Gascard, *Ann. chim.*, 1921, **15**, 332.

Heptadecanol-9 (Di-n-octylcarbinol, 9-hydroxyheptadecane)

$C_{17}H_{36}O$ MW, 256

Plates from $EtOH.Aq$. M.p. 61°. Sol. most org. solvents. Insol. H_2O .

Kipping, *J. Chem. Soc.*, 1893, **63**, 457.

Messer, *Chem. News*, 1929, **138**, 292.

Heptadecanone-2.

See Methyl pentadecyl Ketone.

Heptadecanone-9.

See Di-n-octyl Ketone.

Heptadecatetraene (Aplotaxene)

$C_{17}H_{28}$ MW, 232

Constituent of certain root oils. B.p. 153–5°/11 mm. $D_4^{21} 0.8310$. $n_D^{21} 1.483$. Red. \rightarrow heptadecatriene (*dihydro-aplotaxene*), b.p. 154–7°/11 mm., $D_4^{21} 0.8177$, $n_D^{21} 1.471$.

Semmler, Feldstein, *Ber.*, 1914, **47**, 2690.

Heptadecatriene.

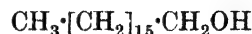
See under Heptadecatetraene.

Heptadecene.

See Heptadecylene.

Heptadecylacetanilide.

See under Heptadecylaniline.

Heptadecyl Alcohol (Heptadecanol-1, 1-hydroxyheptadecane)

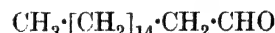
$C_{17}H_{36}O$ MW, 256

Cryst. from Me_2O . M.p. 54°. Sol. $EtOH$, Et_2O .

Stearate : plates. M.p. 64·7°.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 531.

Gascard, *Ann. chim.*, 1921, **15**, 347.

Heptadecyl Aldehyde (Margaric aldehyde, heptadecanal)

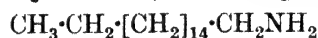
$C_{17}H_{34}O$ MW, 254

Needles from pet. ether. M.p. 36°. Cryst. + $1C_2H_5OH$ from abs. $EtOH$. M.p. 52°. B.p. 204°/26 mm. Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. $EtOH$, Me_2CO , $AcOEt$. Decolourises $KMnO_4$. Long standing \rightarrow trimeric form, m.p. 77–8°. Ox. \rightarrow heptadecylic acid.

Semicarbazone : m.p. 108°. Sol. $EtOH$. Spar. sol. $CHCl_3$, C_6H_6 . Insol. Et_2O , pet. ether.

Oxime : m.p. 89·5°.

Le Sueur, *J. Chem. Soc.*, 1904, **85**, 832.

Heptadecylamine (1-Aminoheptadecane)

$C_{17}H_{37}N$ MW, 255

Cryst. M.p. 49°. B.p. 335–40°. Sol. $EtOH$, Et_2O . Insol. H_2O . Non-volatile in steam.

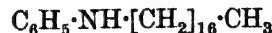
B.HCl : m.p. 158°.

N-Acetyl : m.p. 62°.

N-Benzoyl : leaflets from C_6H_6 . M.p. 91°.

Nageli, Grüntuch, Lendorff, *Helv. Chim. Acta*, 1929, **12**, 236.

v. Braun, Sobacki, *Ber.*, 1911, **44**, 1473.

Heptadecylaniline (N-Phenylheptadecylamine)

$C_{23}H_{41}N$ MW, 331

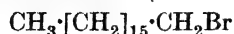
Plates from $EtOH$, rapidly changing to needles. M.p. 42–3°. B.p. 285–6°/35 mm. Sol. Et_2O , Me_2CO , $CHCl_3$, $AcOEt$, C_6H_6 , pet. ether. Spar. sol. cold $EtOH$. Insol. HCl .

B.HCl : plates from pet. ether. M.p. 99–100°. Hyd. by hot H_2O .

N - Acetyl : N - heptadecylacetanilide.
 $C_{25}H_{43}ON$. MW, 373. Needles from MeOH.Aq.
 M.p. 42-3°.

Le Sueur, *J. Chem. Soc.*, 1910, **97**, 2435.

Heptadecyl bromide (1-Bromoheptadecane)



$C_{17}H_{35}Br$ MW, 319

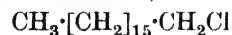
M.p. 32°. B.p. 193-200°/10 mm.

v. Braun, Irmisch, *Ber.*, 1932, **65**, 881.

Heptadecylcatechol.

See Hydrolaccol and Hydrothitsiol.

Heptadecyl chloride (1-Chloroheptadecane)



$C_{17}H_{35}Cl$ MW, 274.5

Cryst. M.p. 24°. B.p. 192-5°/10 mm.

v. Braun, Sobiecki, *Ber.*, 1911, **44**, 1473.

Heptadecylene-8 (Heptadecene-8, sym.-n-heptyl-n-octyl-ethylene)



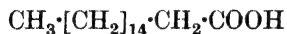
$C_{17}H_{34}$ MW, 238

B.p. 160°/9.5 mm. D^{20}_D 0.7977.

Mai, *Ber.*, 1889, **22**, 2135.

Messer, *Chem. News*, 1929, **138**, 292.

Heptadecylic Acid (Margaric acid, heptadecanoic acid, heptadecoic acid. See also Margaric Acid)



$C_{17}H_{34}O_2$ MW, 270

Plates from pet. ether. M.p. 60-1°. B.p. 227°/100 mm. D^{20}_D 0.8532. n^{20}_D 1.4342. Sol. Et_2O . Spar. sol. EtOH. Dist. of Ba salt \rightarrow methyl hexadecyl ketone.

Me ester : $C_{18}H_{36}O_2$. MW, 284. Plates from EtOH. M.p. 29°. Sol. Et_2O , C_6H_6 .

Et ester : $C_{19}H_{38}O_2$. MW, 298. Plates from EtOH.Aq. M.p. 28° (24°). Sol. Et_2O . Insol. H_2O .

Phenyl ester : $C_{23}H_{38}O_2$. MW, 346. M.p. 37°.

Amide : $C_{17}H_{35}ON$. MW, 269. Plates from EtOH. M.p. 108°. Sol. EtOH. Spar. sol. cold Et_2O .

Nitrile : $C_{17}H_{33}N$. MW, 251. Cryst. from EtOH. B.p. 208°/10 mm. Sol. hot EtOH, Et_2O . Spar. sol. cold EtOH.

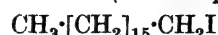
Le Sueur, *J. Chem. Soc.*, 1904, **85**, 836.

Krafft, *Ber.*, 1879, **12**, 1672.

Levene, West, *J. Biol. Chem.*, 1913, **16**, 477.

Bömer, Limprich, *Chem. Zentr.*, 1912, II, 703.

Heptadecyl iodide (1-Iodoheptadecane)



$C_{17}H_{35}I$ MW, 366

Leaflets from Me_2CO . M.p. 33.6°. B.p. 158-9°/0.5 mm.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 531.

Heptadecyl-1-naphthylamine (1-N-Naphthylheptadecylamine)



$C_{27}H_{43}N$ MW, 381

Cryst. from EtOH. M.p. 53-5°. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 , pet. ether. Insol. H_2O , dil. HCl.

B, HCl : plates from pet. ether. M.p. 96-7°.

N-Benzenesulphonyl : needles from EtOH. M.p. 66-8°.

Le Sueur, *J. Chem. Soc.*, 1911, **99**, 831.

Heptadecyl-2-naphthylamine (2-N-Naphthylheptadecylamine)



$C_{27}H_{43}N$ MW, 381

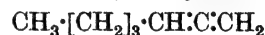
Plates from EtOH. M.p. 60-1°. Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. pet. ether. Insol. H_2O , HCl.

B, HCl : needles from $CHCl_3$ -pet. ether. M.p. 170-1°.

N-Benzenesulphonyl : needles from EtOH. M.p. 51-2°.

Le Sueur, *J. Chem. Soc.*, 1911, **99**, 828.

1 : 2-Heptadiene (n-Butylallene)



C_7H_{12} MW, 96

B.p. 105-6°. D^{18}_D 0.7306. n^{18}_D 1.432.

Bouis, *Compt. rend.*, 1926, **183**, 133.

1 : 4-Heptadiene (1-Methylene-3-propylidene-propane, 4-propylidene-1-butylene, 1-vinyl-2-pentene)



C_7H_{12} MW, 96

B.p. 92°. D^{20}_D 0.7176. n^{20}_D 1.420.

Shoemaker, Boord, *J. Am. Chem. Soc.*, 1931, **53**, 1505.

2 : 4-Heptadiene (1-Propylidene-2-butylene, sym.-methyl- α -butenyl-ethylene, 1-methyl-1 : 3-hexadiene, 1-propenyl-1-butylene)

$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH} : \text{CH} \cdot \text{CH} : \text{CH} \cdot \text{CH}_3$
 C_7H_{12} MW, 96

B.p. 107°. D_4^{15} 0.7341. $n_D^{21.5}$ 1.4486.

Reif, *Ber.*, 1908, **41**, 2744.

Prévost, *Compt. rend.*, 1926, **182**, 853.

1 : 5-Heptadienol-4.

See Propenylallylcarbinol.

1 : 6-Heptadienol-4.

See Diallylcarbinol.

2 : 4-Heptadienone-6 (Crotonylideneacetone, β -butenylideneacetone, methyl 1 : 3-pentadienyl ketone, 1-aceto-1 : 3-pentadiene, 6-ketoheptadiene-2 : 4)

$\text{CH}_3 \cdot \text{CO} \cdot \text{CH} : \text{CH} \cdot \text{CH} : \text{CH} \cdot \text{CH}_3$

$\text{C}_7\text{H}_{10}\text{O}$ MW, 110

B.p. 88°/28 mm., 78°/16 mm. D^{15} 0.8990. n_D^{15} 1.5195. Resinifies on standing in air.

Oxime : m.p. 90-2°.

Semicarbazone : m.p. 157-8°.

Phenylhydrazone : m.p. 70-1°.

Auwers, Eisenlohr, *J. prakt. Chem.*, 1911, **84**, 65.

Meerwein, *Ann.*, 1908, **358**, 87.

1 : 5-Heptadi-ine (1-Methinyl-3-propinyl-propane, 1-acetylenyl-3-propinyl-ethane)

$\text{CH}_3 \cdot \text{C} : \text{C} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{C} : \text{CH}$

C_7H_8 MW, 92

B.p. 26-7°/30 mm. D^{21} 0.8100. n_D^{21} 1.452. Alc. $\text{AgNO}_3 \rightarrow$ white ppt. $\text{Cu}_2\text{Cl}_2 \rightarrow$ yellow ppt.

Urion, *Compt. rend.*, 1927, **185**, 1286.

1 : 6-Heptadi-ine (1 : 5-Dimethinylpentane, 1 : 3-diacetylenylpropane)

$\text{HC} : \text{C} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{C} : \text{CH}$

C_7H_8 MW, 92

B.p. 112°. D^{17} 0.8164. n_D^{17} 1.451. Gives pts. with Cu_2Cl_2 , HgCl_2 , AgNO_3 .

Lespieau, Journaud, *Compt. rend.*, 1929, **188**, 1410.

2 : 5-Heptadi-inol-4 (Dipropinylcarbinol, diacetylenylisopropyl alcohol, 4-hydroxyheptadi-ine-2 : 5)

$\text{CH}_3 \cdot \text{C} : \text{C} \cdot \text{CH}(\text{OH}) \cdot \text{C} : \text{C} \cdot \text{CH}_3$

$\text{C}_7\text{H}_8\text{O}$ MW, 108

Leaflets from CCl_4 . M.p. 105-6°. Sublimés in vacuum.

Jozitsch, Lebedew, *J. Russ. Phys.-Chem. Soc.*, 1910, **42**, 1494.

Viguier, *Compt. rend.*, 1911, **153**, 957.

n-Heptaldehyde (Oenanthaldehyde, α -nanthol)

$\text{CH}_3 \cdot [\text{CH}_2]_4 \cdot \text{CH}_2 \cdot \text{CHO}$

$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

M.p. -43.3°. B.p. 152.8°, 79.3°/86 mm., 66.9°/41 mm., 59.6°/30 mm., 44.4°/8.96 mm. D_4^{15} 0.82162, D_4^{20} 0.8495. n_D^{20} 1.42571. $\text{CrO}_3 \rightarrow$ n-heptylic acid. $\text{H} + \text{Pt}$ in $\text{AcOH} \rightarrow$ n-heptyl alcohol.

Oxime : plates from EtOH. M.p. 57-8° (50°). B.p. 195°, 100.5°/14 mm. Al_2O_3 at 340-60° \rightarrow n-heptylic nitrile.

Cyanhydrin : see under 1-Hydroxycaprylic Acid.

Semicarbazone : m.p. 109°.

Phenylhydrazone : b.p. 202.5-203°.

p-Nitrophenylhydrazone : m.p. 73°.

Diethylacetal : b.p. 204-5°/774 mm. D^{17} 0.836.

Sherrill, *J. Am. Chem. Soc.*, 1930, **52**, 1991.

Sabatier, Mailhe, *Compt. rend.*, 1914, **158**, 986.

Krafft, *Ber.*, 1877, **10**, 2035.

Heptamethylene.

See Cycloheptane.

Heptamethylenediamine (1 : 7-Diaminoheptane)

$\text{H}_2\text{N} \cdot \text{CH}_2 \cdot [\text{CH}_2]_5 \cdot \text{CH}_2 \cdot \text{NH}_2$

$\text{C}_7\text{H}_{18}\text{N}_2$ MW, 130

Needles from EtOH. M.p. 28-9°. B.p. 223-5°. B_2HCl : needles from EtOH. Decomp. at about 250°.

NN-Dibenzoyl : cryst. from EtOH. M.p. 124°.

NN-Di-benzenesulphonyl : m.p. 104°.

v. Braun, Müller, *Ber.*, 1905, **38**, 2206.

Heptamethylene Glycol.

See Heptandiol-1 : 7.

Heptandiol-1 : 2 (1 : 2-Dihydroxyheptane, n-amylethylene glycol, 1-heptene glycol)

$\text{CH}_3 \cdot [\text{CH}_2]_4 \cdot \text{CH}(\text{OH}) \cdot \text{CH}_2\text{OH}$

$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

B.p. 127.5-128.5°/15 mm., 128-30°/11 mm. $\text{HCl} \rightarrow$ 1-chloro-2-hydroxyheptane.

d.

B.p. 90°/1 mm. (93-4°/1 mm.). $[\alpha]_D^{25} + 16.81^\circ$ in EtOH.

Di-phenylurethane : m.p. 109° (111–12°). $[\alpha]_D^{25} + 12.14^\circ$ in EtOH.

Hershberg, *Helv. Chim. Acta*, 1934, **17**, 357.

v. Braun, Schirmacher, *Ber.*, 1923, **56**, 1847.

Levene, Walti, *J. Biol. Chem.*, 1932, **98**, 737.

Heptandiol-1 : 4 (1 : 4-*Dihydroxyheptane*, 1-*n-propyltetramethylene glycol*)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

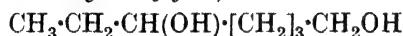
B.p. 240–5°/750 mm., 126.5–128.5°/4 mm. Misc. with H_2O . D_4^{20} 0.9559. n_D^{25} 1.4510.

Diacetyl : b.p. 249–52°/748 mm., 113–113.5°/1 mm. D_4^{20} 1.0135, D_4^{20} 0.9934. n_D^{25} 1.4268.

1-*Naphthylurethane* : cryst. from ligroin. M.p. 81–2°.

Bray, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2105.

Heptandiol-1 : 5 (1 : 5-*Dihydroxyheptane*, 1-*ethylpentamethylene glycol*)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

B.p. 126–8°/1.8 mm. Sol. most org. solvents. Insol. H_2O . D_4^{20} 0.9705. n_D^{25} 1.4571.

Di-p-nitrobenzoyl : m.p. 82–3°.

Pierce, Adams, *J. Am. Chem. Soc.*, 1925, **47**, 1102.

Heptandiol-1 : 7 (1 : 7-*Dihydroxyheptane*, *heptamethylene glycol*)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

M.p. 22.5° (19°). B.p. 262°, 172°/35 mm., 148–9°/10 mm. Sol. H_2O , EtOH. Spar. sol. Et_2O . Hygroscopic. HBr at 130–40° \rightarrow 1 : 7-dibromoheptane.

Di-Me ether : $\text{C}_9\text{H}_{20}\text{O}_2$. MW, 160. B.p. 201° (189–90°), 108°/38 mm. D_4^{20} 0.8705, D_4^{15} 0.8606. n_D^{15} 1.4126.

Di-Et ether : $\text{C}_{11}\text{H}_{24}\text{O}_2$. MW, 188. B.p. 226°, 129°/35 mm. D_4^{20} 0.8786, D_4^{15} 0.853.

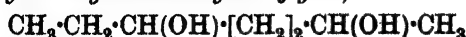
Diacetyl : b.p. 274°. D_4^{20} 1.0219.

Di-phenylurethane : m.p. 137° (134°).

Dionneau, *Ann. chim.*, 1915, **3**, 247.

Müller, Rölz, *Monatsh.*, 1927, **48**, 736.

Heptandiol-2 : 5 (2 : 5-*Dihydroxyheptane*, 1-*methyl-4-ethyltetramethylene glycol*)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

B.p. 132°/18.5 mm. Hot dil. $\text{H}_2\text{SO}_4 \rightarrow$ 2-methyl-5-ethyltetrahydrofuran.

Diacetyl : b.p. 121–4°/11 mm. Insol. H_2O .

Di-phenylurethane : m.p. 147°.

Wohlgemuth, *Ann. chim.*, 1914, **2**, 435.

Heptandiol-2 : 6 (2 : 6-*Dihydroxyheptane*, 1 : 5-*dimethylpentamethylene glycol*)

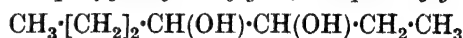


$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

B.p. 128°/30 mm. $\text{H}_2\text{SO}_4 \rightarrow$ 2 : 6-dimethyl-tetrahydropyran.

Fargher, Perkin, *J. Chem. Soc.*, 1914, **105**, 1360.

Heptandiol-3 : 4 (3 : 4-*Dihydroxyheptane*, 1-*ethyl-2-n-propylethylene glycol*, 3-*heptene glycol*)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

M.p. 98–9° (96–96.5°). B.p. 212°/761 mm. Sol. H_2O and most org. solvents. n_D^{25} 1.4420.

Di-p-nitrobenzoyl : m.p. 157.5–158.5°.

Pierce, Adams, *J. Am. Chem. Soc.*, 1925, **47**, 1101.

Mathus, Gibon, *Bull. soc. chim. Belg.*, 1925, **34**, 303.

Heptandione-2 : 4.

Butyrylacetone, *q.v.*

Heptandione-2 : 6 (2 : 6-*Diketoheptane*, sym.-*diacetopropane* 1 : 3-*diacetylpropane*)



$\text{C}_7\text{H}_{12}\text{O}_2$ MW, 128

Cryst. from ligroin. M.p. 33–4°. B.p. 221–4°/764 mm. slight decomp., 96.5–97°/10–11 mm. Sol. H_2O , EtOH, Et_2O , C_6H_6 . D_4^{27} 0.93986. n_D^{27} 1.42767. Reduces hot Fehling's and $\text{NH}_3 \cdot \text{AgNO}_3$. Hot. dil. $\text{H}_2\text{SO}_4 \rightarrow$ 1-methyl-1-cyclohexenone-3.

Dioxime : prisms from ligroin. M.p. 89°.

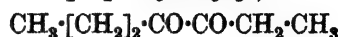
Disemicarbazone : m.p. 215°.

Di-p-nitrophenylhydrazone : m.p. 182–3°.

Fargher, Perkin, *J. Chem. Soc.*, 1914, **105**, 1361.

Harries, *Ber.*, 1914, **47**, 787.

Heptandione-3 : 4 (3 : 4-*Diketoheptane*, *ethyl propyl diketone propionylbutyryl*)



$\text{C}_7\text{H}_{12}\text{O}_2$ MW, 128

B.p. 147°/732 mm. D_4^{20} 0.885.

3-*Oxime* : b.p. 145°/60 mm. Insol. H_2O .

Dioxime : cryst. from EtOH. M.p. 167–8°.

Sol. EtOH, Et₂O, Me₂CO. Spar. sol. H₂O, C₆H₆, ligroin.

Fileti, Ponzio, *J. prakt. Chem.*, 1897, **55**, 194.

Ponzio, Borelli, *Gazz. chim. ital.*, 1902, **32**, 421.

Heptandione-3 : 5 (3 : 5-Diketoheptane, di-propionylmethane)



C₇H₁₂O₂ MW, 128

B.p. 172-3°/711 mm. D₂₀⁰ 0.9445.

Fischer, Bartholomäus, *Ber.*, 1912, **45**, 1983.

n-Heptane



C₇H₁₆ MW, 100

M.p. -90.65°. B.p. 98.38°. D₄²⁰ 0.68378, D₄²⁵ 0.67963. n_D²⁰ 1.38777, n_D²⁵ 1.38553.

Shepard, Henne, Midgley, *J. Am. Chem. Soc.*, 1931, **53**, 1948.

Karvonen, *Chem. Abstracts*, 1931, **25**, 2412.

Edgar, Calingaert, *J. Am. Chem. Soc.*, 1929, **51**, 1540.

Heptane-1-carboxylic Acid.

See n-Caprylic Acid.

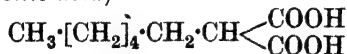
Heptane-4-carboxylic Acid.

See Dipropylacetic Acid.

Heptane-1 : 7-dial.

See Pimelic Dialdehyde.

Heptane-1 : 1-dicarboxylic Acid (n-Hexylmalonic acid)



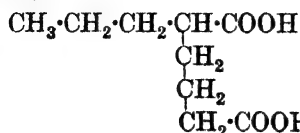
C₉H₁₆O₄ MW, 188

Cryst. from C₆H₆. M.p. 103-5°.

Di-Et ester : C₁₃H₂₄O₄. MW, 244. B.p. 150-5°/20 mm.

v. Braun, *Ber.*, 1934, **67**, 224.

Heptane-1 : 4-dicarboxylic Acid (1-Propyladipic acid)

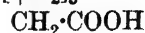
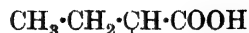


C₉H₁₆O₄ MW, 188

M.p. 55-9°. k = 4.2 × 10⁻⁵ at 24.4°.

Mellor, *J. Chem. Soc.*, 1901, **79**, 131.

Heptane-1 : 5-dicarboxylic Acid (1-Ethylpimelic acid)



C₉H₁₆O₄ MW, 188

M.p. 41.5-43°. B.p. 260-5°/82 mm.

Di-Et ester : C₁₃H₂₄O₄. MW, 244. B.p. 198-200°/83 mm.

Dianilide : cryst. from C₆H₆. M.p. 145°.

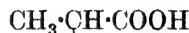
Crossley, Perkin, *J. Chem. Soc.*, 1894, **65**, 990.

Carter, *J. Am. Chem. Soc.*, 1928, **50**, 1967. See also previous reference.

Heptane-1 : 7-dicarboxylic Acid.

See Azelaic Acid.

Heptane-2 : 4-dicarboxylic Acid (1-Methyl-3-propylglutaric acid)



C₉H₁₆O₄ MW, 188

Exists in two modifications.

(i) M.p. 101-2°. k = 5.9 × 10⁻⁵ at 25°.

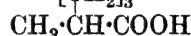
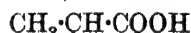
(ii) Needles from ligroin. M.p. 51-3°. k = 5.4 × 10⁻⁵ at 25°.

Bischoff, Tigerstedt, *Ber.*, 1890, **23**, 1940.

Heptane-2 : 5-dicarboxylic Acid.

See 1-Methyl-4-ethyladipic Acid.

Heptane-2 : 6-dicarboxylic Acid (1 : 5-Dimethylpimelic acid)



C₉H₁₆O₄ MW, 188

Exists in two modifications.

(i) Prisms from H₂O. M.p. 81-81.5°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Spar. sol. ligroin. 100 parts H₂O dissolve 1.17 parts at 15°. k = 3.44 × 10⁻⁵ at 25°.

Dianilide : m.p. 183-4°.

(ii) Cryst. from H₂O. M.p. 76-76.5°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Spar. sol. ligroin. 100 parts H₂O dissolve 2.206 parts at 15°. k = 3.43 × 10⁻⁵ at 25°.

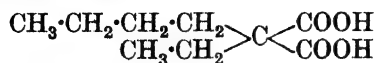
Di-Et ester : C₁₃H₂₄O₄. MW, 244. B.p. 195-6°/100 mm. D₄²⁰ 0.9817.

Dianilide : m.p. 154-5°.

Kipping, *J. Chem. Soc.*, 1895, **67**, 143, 149.

Perkin, Prentice, *J. Chem. Soc.*, 1891, **59**, 831.

Heptane-3 : 3-dicarboxylic Acid (*Ethyl-butylmalonic acid*)



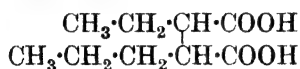
$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Needles from H_2O . M.p. 116° . $k = 1.163 \times 10^{-2}$ at 25° . Heat \rightarrow 1-ethylcaproic acid.

Di-Et ester: $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. B.p. $235-45^\circ$.

Raper, *J. Chem. Soc.*, 1907, 91, 1837.

Heptane-3 : 4-dicarboxylic Acid (*1-Ethyl-2-propylsuccinic acid*)



$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Exists in two modifications.

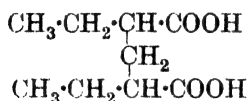
(i) M.p. $178-9^\circ$.

Di-Et ester: $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. B.p. $134-5^\circ/16$ mm.

(ii) M.p. $97-8^\circ$.

Fichter, *Ann.*, 1908, 361, 388.

Heptane-3 : 5-dicarboxylic Acid (*1 : 3-Di-ethylglutaric acid*)



$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Exists in two modifications.

(i) M.p. $119.5-120^\circ$. Sol. EtOH, Et_2O , CHCl_3 , Me_2CO , C_6H_6 . Mod. sol. ligroin. 100 parts H_2O dissolve 0.8095 parts at 19° . $k = 5.5 \times 10^{-5}$ at 25° .

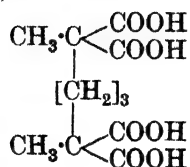
(ii) M.p. $93.5-94.5^\circ$. 100 parts H_2O dissolve 1.5280 parts at 19° . $k = 5.95 \times 10^{-5}$ at 25° .

Reformatski, *Chem. Zentr.*, 1902, II, 107.

Heptane-4 : 4-dicarboxylic Acid.

See Dipropylmalonic Acid.

Heptane-2 : 2 : 6 : 6-tetracarboxylic Acid



$\text{C}_{11}\text{H}_{16}\text{O}_8$ MW, 276

M.p. $210-11^\circ$ decomp. Sol. EtOH. Spar. sol. H_2O , Et_2O , CHCl_3 , C_6H_6 . $k = 3.7 \times 10^{-3}$ at 25° . Heat \rightarrow heptane-2 : 6-dicarboxylic acid.

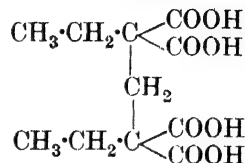
Tetra-Et ester: $\text{C}_{19}\text{H}_{32}\text{O}_8$. MW, 388. B.p. $238-40^\circ/30$ mm., $220-30^\circ/20$ mm.

Perkin, Prentice, *J. Chem. Soc.*, 1891, 59, 829.

Bischoff, *Ber.*, 1895, 28, 2828.

Noyes, *Am. Chem. J.*, 1898, 20, 793.

Heptane-3 : 3 : 5 : 5-tetracarboxylic Acid



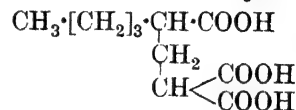
$\text{C}_{11}\text{H}_{16}\text{O}_8$ MW, 276

Cryst. from Et_2O . Heat at $163^\circ \rightarrow$ 1 : 3-diethylglutaric acid.

Tetra-Et ester: $\text{C}_{19}\text{H}_{32}\text{O}_8$. MW, 388. M.p. 61° . B.p. $195^\circ/12$ mm.

Dressel, *Ann.*, 1890, 256, 186.

Heptane-1 : 1 : 3-tricarboxylic Acid

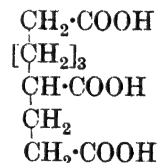


$\text{C}_{10}\text{H}_{16}\text{O}_6$ MW, 232

Cryst. from Et_2O . M.p. 144° .

Blaise, Luttringer, *Bull. soc. chim.*, 1905, 33, 782.

Heptane-1 : 3 : 7-tricarboxylic Acid



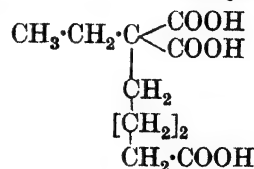
$\text{C}_{10}\text{H}_{16}\text{O}_6$ MW, 232

Free acid not isolated.

Anhydride: $\text{C}_{10}\text{H}_{14}\text{O}_5$. MW, 214. Nodules from C_6H_6 . M.p. $72-3^\circ$. B.p. $250-60^\circ/0.2$ mm.

Haworth, Mavin, *J. Chem. Soc.*, 1933, 1015.

Heptane-1 : 5 : 5-tricarboxylic Acid



$\text{C}_{10}\text{H}_{16}\text{O}_6$ MW, 232

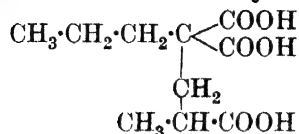
M.p. $86-8^\circ$. Heat \rightarrow heptane-1 : 5-dicarboxylic acid.

Tri-Et ester: $C_{16}H_{28}O_6$. MW, 316. B.p. 189–91°/20 mm.

Mellor, *J. Chem. Soc.*, 1901, **79**, 132.

Carter, *J. Am. Chem. Soc.*, 1928, **50**, 1969.

Heptane-2 : 4 : 4-tricarboxylic Acid



$C_{10}H_{16}O_6$ MW, 232

M.p. 167–8° decomp. Sol. H_2O , Et_2O . $k = 1.02 \times 10^{-2}$ at 15°. Heat \rightarrow 1-methyl-3-propylglutaric acid.

Tri-Et ester: $C_{16}H_{28}O_6$. MW, 316. B.p. 300–1°.

Bischoff, Tigerstedt, *Ber.*, 1890, **23**, 1937.

Heptanol-1.

See *n*-Heptyl Alcohol.

Heptanol-2.

See Methyl-*n*-amylcarbinol.

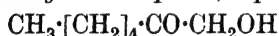
Heptanol-3.

See Ethyl-*n*-butylcarbinol.

Heptanol-4.

See Dipropylcarbinol.

1-Heptanolone-2 (*Hydroxymethyl n-amyl ketone, 1-hydroxy-2-ketoheptane, caproylcarbinol*)



$C_7H_{14}O_2$ MW, 130

B.p. 95°/20 mm. Reduces cold Fehling's.

Levene, Walti, *J. Biol. Chem.*, 1932, **98**, 736.

2-Heptanolone-5 (*Ethyl 3-hydroxy-n-butyl ketone, 2-hydroxy-5-ketoheptane*)



$C_7H_{14}O_2$ MW, 130

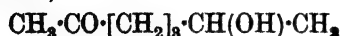
B.p. 86.5°/11 mm. Dist. \rightarrow 2-methyl-5-ethyl-2 : 3-dihydrofuran. $\text{NaHg} \rightarrow$ heptandiol-2 : 5.

Oxime: b.p. 149–50°/13 mm.

Phenylurethane: m.p. 79°.

Wohlgemuth, *Ann. chim.*, 1914, **2**, 432.

2-Heptanolone-6 (*Methyl 4-hydroxy-n-amyl ketone, methyl-3-acetopropylcarbinol, 2-hydroxy-6-ketoheptane*)

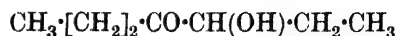


$C_7H_{14}O_2$ MW, 130

B.p. 117°/20 mm. $\text{CrO}_3 \rightarrow$ heptandione-2 : 6
 $\text{NaHg} \rightarrow$ heptandiol-2 : 6.

Fargher, Perkin, *J. Chem. Soc.*, 1914, **105**, 1359.

3-Heptanolone-4 (*Ethylbutyrylcarbinol, propyl 1-hydroxypropyl ketone, 3-hydroxy-4-ketoheptane*)



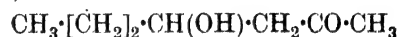
$C_7H_{14}O_2$ MW, 130

B.p. 181–2° 86–7°/26 mm., 75–6°/18 mm.
 D_4^{20} 0.9309.

Semicarbazone: m.p. 117–18°.

Vénus-Daniloff, *Bull. soc. chim.*, 1928, **43**, 576.

4-Heptanolone-2 (*Methyl 2-hydroxy-n-amyl ketone, 4-hydroxy-2-ketoheptane, propylacetonylcarbinol*)



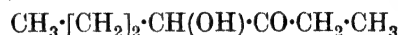
$C_7H_{14}O_2$ MW, 130

B.p. 95°/12 mm. $D_4^{19.5}$ 0.9296. $n_D^{19.5}$ 1.4357.

Eccott, Linstead, *J. Chem. Soc.*, 1930, 911.

Grignard, Dubien, *Ann. chim.*, 1924, **2**, 288.

4-Heptanolone-3 (*Ethyl 1-hydroxybutyl ketone, propylpropionylcarbinol, 4-hydroxy-3-ketoheptane*)



$C_7H_{14}O_2$ MW, 130

B.p. 176–7°, 83–5°/26 mm., 74–5°/18 mm.
 D_4^{20} 0.9235.

Semicarbazone: m.p. 121–2°.

Vénus-Daniloff, *Bull. soc. chim.*, 1928, **43**, 578.

Heptanone-2.

See Methyl *n*-amyl Ketone.

Heptanone-3.

See Ethyl *n*-butyl Ketone.

Heptanone-4.

Butyrone, *q.v.*

Heptantriol-1 : 2 : 3 (*1-n-Butylglycerol, 1 : 2 : 3-trihydroxyheptane*)



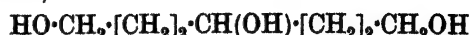
$C_7H_{16}O_3$ MW, 148

M.p. 52–4°. B.p. 175–175.5°/17 mm. Hygroscopic. Bitter taste.

Triacetyl: b.p. 174°/21 mm.

Delaby, *Compt. rend.*, 1922, **175**, 1153.

Heptantriol-1 : 4 : 7 (*1 : 4 : 7-Trihydroxyheptane*)

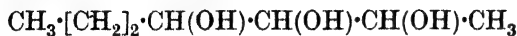


$C_7H_{16}O_3$ MW, 148

Viscous liq. with sweet taste. B.p. 230-2°/25 mm. D_4^{20} 1.084, D_4^{18} 1.075. n_D^{18} 1.4738. Hot dil. $H_2SO_4 \rightarrow$ 2-(3-hydroxypropyl)-tetrahydrofuran.

Hamonet, *Ann. chim.*, 1918, 10, 26.

Heptantriol-2 : 3 : 4 (1-Methyl-3-n-propylglycerol, 2 : 3 : 4-trihydroxyheptane)



$C_7H_{16}O_3$ MW, 148

B.p. 162-4°/25 mm.

Delaby, Morel, *Compt. rend.*, 1925, 180, 1409.

Heptantrione-2 : 4 : 6.

Diacetylacetone, *q.v.*

1 : 3 : 5-Heptatriene (1-Vinyl-3-propylidene-propylene, 1-methylene-4-ethylidene-2-butylene, sym.-vinylpropenylethylene)



C_7H_{10} MW, 94

Colourless liq. B.p. 113-14°. D_4^{20} 0.764. n_D 1.50786.

Auwers, Westermann, *J. prakt. Chem.*, 1923, 105, 373.

1 : 3 : 6-Heptatriene (sym.-Vinylallylethylene, 1-allylbutadiene-1 : 3, 1 : 3-divinylpropylene)

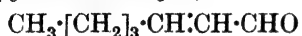


C_7H_{10} MW, 94

B.p. 115°. Partially polymerises on boiling. Br \rightarrow hexabromide.

Saytzeff, *Ann.*, 1877, 185, 144.

1-Heptenal (2-Butylacrolein, 1-heptenic aldehyde, 3-propylcrotonaldehyde)



$C_7H_{12}O$ MW, 112

B.p. 165-7°. D_4^{17} 0.864. n_D^{17} 1.4468.

Semicarbazone : m.p. 169°.

p-Nitrophenylhydrazone : m.p. 154°.

Delaby, Guillot-Allegre, *Compt. rend.*, 1931, 192, 1467.

1-Heptene (1-Heptylene, n-amylethylene)



C_7H_{14} MW, 98

B.p. 93.7-93.8°/771 mm., 90.5-90.8°/720 mm. D_4^{20} 0.6973. n_D^{20} 1.3996.

Dibromide : 1 : 2-dibromoheptane. $C_7H_{14}Br_2$. MW, 258. Bp. 116°/25 mm. D_4^{20} 1.5180. n_D^{20} 1.5022.

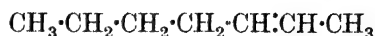
Glycol : see Heptandiol-1 : 2.

Wilkinson, *J. Chem. Soc.*, 1931, 134, 3057.

Waterman, De Kok, *Rec. trav. chim.*, 1933, 52, 298.

Herschberg, *Helv. Chim. Acta*, 1934, 17, 356.

2-Heptene (2-Heptylene, sym.-methylbutylethylene)



C_7H_{14} MW, 98

B.p. 98.5°. Ox. \rightarrow acetic and valeric acids.

Schorlemmer, Thorpe, *Ann.*, 1883, 217, 150.

3-Heptene (3-Heptylene, sym.-ethylpropylethylene)



C_7H_{14} MW, 98

B.p. 95.8°/768 mm (94°). D_4^{20} 0.7016. n_D^{20} 1.40419. Ox. \rightarrow propionic and butyric acids.

Glycol : see Heptandiol-3 : 4.

Prévost, *Compt. rend.*, 1928, 187, 946.

Mathus, Gibon, *Bull. soc. chim. Belg.*, 1925, 34, 303.

1-Heptenic Acid (1-Hexene-1-carboxylic acid)



$C_7H_{12}O_2$ MW, 128

B.p. 225-8°, 120-2°/11 mm. D_4^{20} 0.9575. n_D^{20} 1.4488. $k = 1.5 \times 10^{-5}$ at 25°. Ox. \rightarrow valeric acid.

Et ester : $C_8H_{16}O_2$. MW, 156. B.p. 81-6°/12 mm.

Rupe, Ronus, Lotz, *Ber.*, 1902, 35, 4268.

2-Heptenic Acid (2-Hexene-1-carboxylic acid, 2-butyldenepropionic acid)

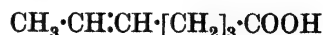


$C_7H_{12}O_2$ MW, 128

B.p. 226-8°. Spar. sol. H_2O . Volatile in steam.

Fittig, Schmidt, *Ann.*, 1889, 255, 77.

4-Heptenic Acid (3-Propenylbutyric acid, 4-ethylidene-n-valeric acid, 2-hexene-6-carboxylic acid)



$C_7H_{12}O_2$ MW, 128

B.p. 222-4°, 117°/11 mm. D_4^{20} 0.9496. n_D^{20} 1.4444. Volatile in steam. Ox. \rightarrow acetic and glutaric acids.

Ciamician, Silber, *Ber.*, 1908, 41, 1075.

v. Braun, Sobecki, *Ber.*, 1911, 44, 1047.

5-Heptenic Acid (1-Hexene-6-carboxylic acid, 4-vinylvaleric acid)



$\text{C}_7\text{H}_{12}\text{O}_2$ MW, 128

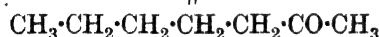
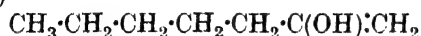
B.p. 225–7°. D_4^{17} 0.952. n_D^{17} 1.4425. Ox. \longrightarrow adipic acid.

Wallach, *Ann.*, 1900, 312, 207.

Heptenic Aldehyde.

See Heptenal.

1-Heptenol-2 (Enol form of methyl *n*-amyl ketone)



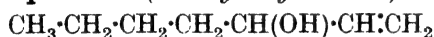
$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

Me ether: $\text{C}_8\text{H}_{16}\text{O}$. MW, 128. B.p. 144.5° D_0^{15} 0.8252. n_D^{15} 1.4284. Dil. $\text{H}_2\text{SO}_4 \longrightarrow$ methyl *n*-amyl ketone.

Et ether: $\text{C}_9\text{H}_{18}\text{O}$. MW, 142. B.p. 161–161.5°. D_0^{15} 0.822, D_0^{15} 0.8125. n_D^{15} 1.4274.

Moureu, *Bull. soc. chim.*, 1904, 31, 522.

1-Heptenol-3 (*n*-Butylvinylcarbinol)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

d.

B.p. 153–5°.

Formyl: b.p. 155–7°. D_4^{20} 0.8754. n_{5896}^{20} 1.4225. $[\alpha]_{5896}^{20} - 17.83^\circ$.

Benzoyl: b.p. 152–3°/18 mm. D_4^{20} 1.0033. n_{5896}^{20} 1.5038. $[\alpha]_{5896}^{20} + 41.47^\circ$.

Acid phthalate: m.p. 50–2°. $[\alpha]_D^{20} + 12.6^\circ$ in EtOH.

l.

B.p. 153–5°, 83°/15 mm. D_4^{20} 0.8360. n_D^{20} 1.4337. $[\alpha]_{5896}^{20} - 26.20^\circ$. Catalytic red. \longrightarrow *d*-ethylbutylcarbinol.

Acetyl: b.p. 165–7°. D_4^{20} 0.8682. n_{5896}^{20} 1.4200. $[\alpha]_{5896}^{20} + 4.36^\circ$.

Acid phthalate: m.p. 50–2°. $[\alpha]_D^{20} - 12.6^\circ$ in EtOH.

dl.

B.p. 153–5°. Passed over Cu at 320° \longrightarrow ethyl butyl ketone.

Acid phthalate: m.p. 56–7°.

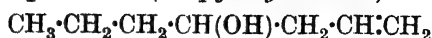
p-Nitrobenzoyl: m.p. 24–5°.

Kenyon, Snellgrove, *J. Chem. Soc.*, 1925, 1169.

Delaby, Dumoulin, *Bull. soc. chim.*, 1926, 39, 1578.

Johnson, Kenyon, *J. Chem. Soc.*, 1932, 722.

1-Heptenol-4 (Propylallylcarbinol)

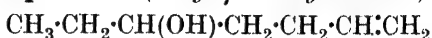


$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

B.p. 145–6°.

I.G., D.R.P., 544,388, (*Chem. Abstracts*, 1932, 26, 2466).

1-Heptenol-5 (Ethyl- γ -butenylcarbinol)

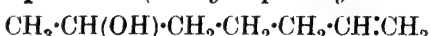


$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

B.p. 60–61.5°/11 mm. D_4^{18} 0.8447. n_D^{18} 1.4369. Spar. sol. H_2O . Misc. with most org. solvents.

Helferich, *Ber.*, 1919, 52, 1810.

1-Heptenol-6 (Methyl-4-pentenylcarbinol)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

Liq. with resinous odour. B.p. 64–5°/13 mm. D_4^{18} 0.8484. n_D^{18} 1.4387. Spar. sol. H_2O . Misc. with most org. solvents.

Helferich, Malkomes, *Ber.*, 1922, 55, 706.

2-Heptenol-1 (2-*n*-Butylallyl alcohol, 2-hexenylcarbinol, 2-heptenyl alcohol)



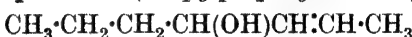
$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

B.p. 177–9°. D_4^{20} 0.8421. n_D^{20} 1.4410.

Acetyl: b.p. 192–4°. D_4^{18} 0.8915. n_D^{18} 1.4314.

Bouis, *Ann. chim.*, 1928, 9, 427.

2-Heptenol-4 (Propylpropenylcarbinol)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

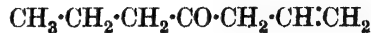
B.p. 152–4°, 104–5°/106 mm., 63°/11 mm. D_4^{14} 0.8422. n_D^{14} 1.4369.

Acetyl: b.p. 168–70°.

Reif, *Ber.*, 1908, 41, 2742.

Auwers, Westermann, *Ber.*, 1921, 54, 2993.

1-Heptenone-4 (Propyl alkyl ketone, ethylvinylacetone)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

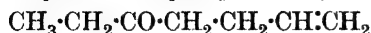
B.p. 146–7°, 54–5°/20 mm. Isomerises readily to 2-heptenone-4. $\text{HBr} \longrightarrow$ 2-bromoheptanone-4.

Oxime: b.p. 92–3°/13 mm. Spar. sol. H_2O .

Semicarbazone: plates from EtOH.Aq. M.p. 110°.

Blaise, *Bull. soc. chim.*, 1905, 33, 42.

1-Heptenone-5 (*Ethyl γ -butenyl ketone, 4-propionyl-1-butylene, methylallylacetone*)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Liq. with unpleasant odour. B.p. $46-7^\circ/12$ mm. $D_4^{18.3}$ 0.8487. $n_D^{18.3}$ 1.4254. Spar. sol. H_2O . Misc. with most org. solvents.

Semicarbazone: plates from EtOH.Aq. M.p. $82-3^\circ$.

Helferich, *Ber.*, 1919, **52**, 1809.

1-Heptenone-6 (*Methyl 4-pentenyl ketone, 5-aceto-1-pentene, γ -butenylacetone*)



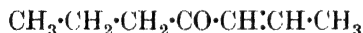
$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Liq. with unpleasant odour. B.p. $41-3^\circ/10$ mm. D_4^{18} 0.8673. n_D^{18} 1.4350. Spar. sol. H_2O . Misc. with most org. solvents.

Semicarbazone: needles from EtOH.Aq. M.p. 108° .

Helferich, Malkomes, *Ber.*, 1922, **55**, 705.

2-Heptenone-4 (*Propyl propenyl ketone, ethylethylideneacetone, 1-butyrylpropylene*)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

B.p. $156-7^\circ$, $74-5^\circ/12$ mm.

Semicarbazone: cryst. from MeOH.Aq. M.p. 147° .

Blaise, *Bull. soc. chim.*, 1905, **33**, 45.

2-Heptenone-6 (*Methyl 3-pentenyl ketone, β -butenylacetone, crotonylacetone, 5-aceto-2-pentene*)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

B.p. $152-5^\circ$, $42-3^\circ/9$ mm. D_4^{20} 0.8446. n_D^{20} 1.4292.

Semicarbazone: plates. M.p. 97° .

Braun, Gossel, *Ber.*, 1924, **57**, 377.

3-Heptenone-2 (*Methyl 1-pentenyl ketone, butylideneacetone, 1-aceto-1-pentene*)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Exists in *cis* and *trans* forms which are not interconvertible.

Cis:

B.p. $70^\circ/15$ mm. D_4^{22} 0.8555. n_D^{22} 1.4505.

Semicarbazone: m.p. 152° .

Trans:

B.p. $62^\circ/15$ mm. D_4^{20} 0.8445. n_D^{20} 1.4430.

Semicarbazone: silvery plates. M.p. 128° .

Eccott, Linstead, *J. Chem. Soc.*, 1930, 914.

3-Heptenone-6 (*Methyl 2-pentenyl ketone, 1-aceto-2-pentene, α -butenylacetone, sym.-ethyl-acetonylethylene*)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Sweet-smelling liq. B.p. $61-2^\circ/20$ mm. D_4^{21} 0.8618. n_D^{21} 1.4290. Boiling 20% $\text{H}_2\text{SO}_4 \longrightarrow$ *trans*-3-heptenone-2.

Semicarbazone: white plates. M.p. $109-10^\circ$.

See previous reference.

2-Heptenyl Alcohol.

See 2-Heptenol-1.

1-Heptine.

See Oenanthylidene.

2-Heptine.

See Methylbutylacetylene.

3-Heptine.

See Ethylpropylacetylene.

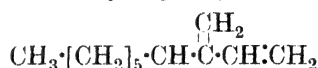
Heptoic Acid.

See Heptylic Acid.

Heptoylacetic Acid.

See 2-Ketopelargonic Acid.

Heptoprene (2-n-Heptyl-1:3-butadiene, 2-heptylerythrene, 3-methylene-1-decylene, butadienylhexane, 2-nonenylethylene)



$\text{C}_{11}\text{H}_{20}$ MW, 152

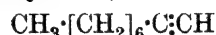
B.p. $52-4^\circ/5$ mm. D_4^{20} 0.7796. n_D^{20} 1.4511.

Carothers, Berchet, *J. Am. Chem. Soc.*, 1933, **55**, 2815.

Heptoylresorcinol.

See Heptylresorcinol.

n-Heptylacetylene (1-Nonine)



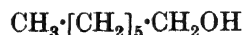
C_9H_{16} MW, 124

B.p. $149-51^\circ$, $51^\circ/8$ mm. D_4^{20} 0.765. n_D^{20} 1.426. Sol. most org. solvents. Insol. H_2O .

Truchet, *Ann. chim.*, 1931, **16**, 410.

Bourguel, *Ann. chim.*, 1925, **3**, 211, 383.

n-Heptyl Alcohol (*Heptanol-1, 1-hydroxy-heptane*)



$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

M.p. -34.1° . B.p. 176.3° . D_4^{20} 0.83622, D_4^{15} 0.82601. n_D^{15} 1.42310. KHSO_4 at $145^\circ \longrightarrow$ diheptyl ether: at $175^\circ \longrightarrow$ heptylene.

Acetyl: n-heptyl acetate. B.p. $191.5^\circ/758.5$ mm. D_4^{20} 0.8891.

Phenylurethane: m.p. 60° .

p-Nitrophenylurethane: m.p. 102° .

Naphthylurethane : m.p. 62°.

Clarke, Dreger, *Organic Syntheses*, Collective Vol. I, 298.

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.

Natta, *Giorn. chim. ind. applicata*, 1930, **12**, 13.

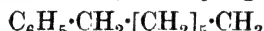
n-Heptylamine.

See 1-Amino-n-heptane.

Heptylaminoethyl Alcohol.

See N-2-Hydroxyethylheptylamine.

n-Heptylbenzene (1-Phenylheptane)



$\text{C}_{13}\text{H}_{20}$ MW, 176
B.p. 240° (235°), 108–10°/10 mm. D_4^{20} 0.8570.
 n_D^{20} 1.4865.

Sabatier, Mailhe, *Compt. rend.*, 1918, **158**, 834.

Heptyl bromide.

See Bromoheptane.

2-n-Heptyl-1 : 3-butadiene.

See Heptoprene.

Heptyl chloride.

See Chloroheptane.

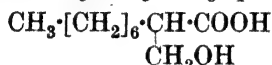
Heptylene.

See Heptene.

n-Heptyl fluoride.

See 1-Fluoroheptane.

1-n-Heptylhydracrylic Acid (Nonanol-2-carboxylic acid, 1-hydroxymethyl-pelargonic acid)

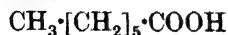


$\text{C}_{10}\text{H}_{20}\text{O}_3$ MW, 188
Cryst. from pet. ether. M.p. 47–8°. Sol. EtOH, Et₂O. Spar. sol. pet. ether. Insol. H₂O.
Et ester : $\text{C}_{12}\text{H}_{24}\text{O}_3$. MW, 216. B.p. 165–6°/22 mm.

Phenylurethane : m.p. 105°.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 651.

n-Heptylic Acid (Heptoic acid, ænanthylic acid, ænanthic acid)



$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130
Oily liq. M.p. – 9°. B.p. 222–45°, 115–16°/11 mm. D_4^{20} 0.93338, D_4^{25} 0.92099. n_D^{20} 1.42219.
 $k = 1.42 \times 10^{-5}$.

Me ester : $\text{C}_8\text{H}_{16}\text{O}_2$. MW, 144. B.p. 172.1°. D_4^{25} 0.8806. n_D^{20} 1.41366.

Et ester : $\text{C}_9\text{H}_{18}\text{O}_2$. MW, 158. M.p. – 66.1°. B.p. 188.6°. D_4^{20} 0.88619, D_4^{25} 0.87297. n_D^{20} 1.41286.

Chloride : $\text{C}_7\text{H}_{13}\text{OCl}$. MW, 148.5. M.p. – 83.8°. B.p. 125.2°. D_4^{20} 0.98079, D_4^{25} 0.96645. n_D^{20} 1.43037.

Anhydride : $\text{C}_{14}\text{H}_{26}\text{O}_3$. MW, 242. M.p. – 12.4°. B.p. 164°/12.5 mm. D_4^{20} 0.93356, D_4^{25} 0.92146. n_D^{20} 1.43283.

Amide : $\text{C}_7\text{H}_{13}\text{ON}$. MW, 127. Needles from EtOH. M.p. 96°.

Nitrile : $\text{C}_7\text{H}_{13}\text{N}$. MW, 111. B.p. 183–4°/765 mm. D_4^{20} 0.8107.

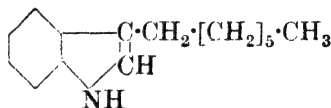
Anilide : m.p. 70–1°.

Deffet, *Bull. soc. chim. Belg.*, 1931, **40**, 385.

Rogers, *J. Am. Pharm. Assocn.*, 1923, **12**, 503.

Guerbet, *Bull. soc. chim.*, 1912, **11**, 168.

3-n-Heptylindole



$\text{C}_{15}\text{H}_{21}\text{N}$ MW, 215

Red liq. B.p. 179–82°/3 mm.

Korczyński, Brydowna, Kierzek, *Gazz. chim. ital.*, 1926, **56**, 907.

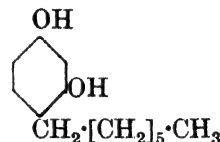
Heptyl iodide.

See Iodoheptane.

sym.-n-Heptyl-n-octyl-ethylene.

See Heptadecylene-8.

4-n-Heptylresercinol (2 : 4-Dihydroxyheptylbenzene, 2 : 4-dihydroxyphenylheptane)



$\text{C}_{13}\text{H}_{20}\text{O}_2$ MW, 208

M.p. 73–74.5°. B.p. 186–8°/6–7 mm.

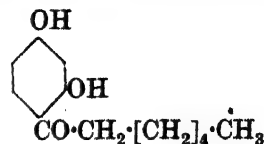
Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1928, **48**, 1692.

Dohme, U.S.P., 1,717,098, (*Chem. Abstracts*, 1929, **23**, 3717).

Heptylpropionic Acid.

See 3-Ketocaproic Acid.

4-n-Heptylresercinol (Hexyl 2 : 4-dihydroxyphenyl ketone, heptoylresercinol)



$\text{C}_{13}\text{H}_{18}\text{O}_3$ MW, 222

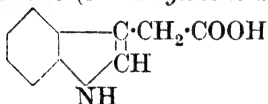
→ hesperetin, rhamnose and glucose.
 $\text{Ba}(\text{OH})_2 \rightarrow$ isoferulic acid.

Diacetyl: needles from $\text{AcOH} \cdot \text{Aq.}$ M.p. 142–3°. $[\alpha]_D^{21} - 32.9^\circ$.

King, Robertson, *J. Chem. Soc.*, 1931, 1704.

Asahina, Inubuse, *Chem. Abstracts*, 1929, 23, 3475.

Heteroauxine (3-Indolylacetic acid)



$\text{C}_{10}\text{H}_9\text{O}_2\text{N}$ MW, 175

Plant-growth hormone occurring in urine. Plates from CHCl_3 . M.p. 164–5°. $[\alpha]_D^{20} - 3.8^\circ$ in EtOH.

Nitrile: $\text{C}_{10}\text{H}_8\text{N}_2$. MW, 156. B.p. 185–90°/3.5 mm., 160°/0.2 mm. **Picrate**: m.p. 127°.

N-Me: m.p. 128°.

Picrate: m.p. 177° (178° decomp.).

Majima, Hoshino, *Ber.*, 1925, 58, 2042.

Kögl, Haagen-Smit, Erxleben, *Z. physiol. Chem.*, 1934, 228, 99.

King, l'Ecuyer, *J. Chem. Soc.*, 1934, 1903.

Heterobetulin

$\text{C}_{30}\text{H}_{50}\text{O}_2$ MW, 442

Plates from C_6H_6 -EtOH. M.p. 267–8° (sinters at 260°). $[\alpha]_D^{20} + 11.59^\circ$. Sol. EtOH, AcOH, C_6H_6 . Spar. sol. Me_2CO .

Diacetyl deriv.: leaflets from EtOH. M.p. 248–9°. $[\alpha]_D^{20} + 28.29^\circ$.

Dibenzoyl deriv.: needles from AcOH. M.p. 222–8°. $[\alpha]_D^{20} + 35.49^\circ$.

Di-p-bromobenzoyl deriv.: needles from AcOH. M.p. 253° (sinters at 200°). $[\alpha]_D^{23} + 40.16^\circ$.

Formate: leaflets from AcOH. M.p. 284–5°. $[\alpha]_D^{19} + 44.52^\circ$.

Dischendorfer, Grillmayer, *Monatsh.*, 1926, 47, 423.

Heteroxanthine.

See 7-Methylxanthine.

Hexa.

See Hexamethylenetetramine.

Hexabenzobenzene.

See Coronene.

Hexabromoacetone (Hexabromopropanone)



C_3OBr_6 MW, 532

Prisms from CHCl_3 . M.p. 107–9°. Very sol. CS_2 , CHCl_3 , Et_2O , C_6H_6 . Insol. H_2O . Decomp. by $\text{C}_2\text{H}_5\text{OH}$.

Weidel, Gruber, *Ber.*, 1877, 10, 1145.

Levy, Jedlicka, *Ann.*, 1888, 249, 80.

Hexabromoacetylacetone (1:1:1:5:5:5-Hexabromopentandione-2:4, 1:1:1:5:5:5-hexabromo-2:4-diketopentane)

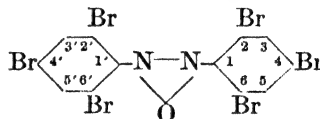


$\text{C}_5\text{H}_2\text{O}_2\text{Br}_6$ MW, 574

Needles from abs. Et_2O . M.p. 107–8°. Decomp. by $\text{C}_2\text{H}_5\text{OH}$.

Combes, *Ann. chim. phys.*, 1887, 12, 236.

2:4:6:2':4':6'-Hexabromoazoxybenzene

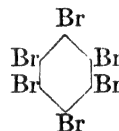


$\text{C}_{12}\text{H}_4\text{ON}_2\text{Br}_6$ MW, 672

Reddish-yellow leaflets from C_6H_6 -EtOH. M.p. 215° decomp. Spar. sol. most org. solvents.

v. Pechmann, Nold, *Ber.*, 1898, 31, 564.

Hexabromobenzene

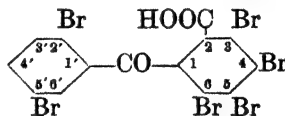


C_6Br_6 MW, 552

Needles from C_6H_6 . M.p. 306° (316°). Spar. sol. Et_2O , EtOH. Sol. pet. ether, CHCl_3 , C_6H_6 , boiling AcOH.

Eckert, Steiner, *Monatsh.*, 1915, 36, 279.

3:4:5:6:2':5'-Hexabromobenzophenone-2-carboxylic Acid (o-[2:5-Dibromobenzoyl]-2:3:4:5-tetrabromobenzoic acid)

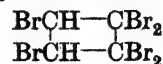


$\text{C}_{14}\text{H}_4\text{O}_3\text{Br}_6$ MW, 700

Cryst. from AcOH. M.p. 218–19°.

Hofmann, *Monatsh.*, 1915, 36, 821.

Hexabromocyclobutane



$\text{C}_4\text{H}_2\text{Br}_6$ MW, 530

Plates from C_6H_6 . M.p. 186.5°. Sol. Me_2CO , CHCl_3 , C_6H_6 . Spar. sol. EtOH, Et_2O , pet. ether.

Willstätter, Bruce, *Ber.*, 1907, 40, 3999.

Hexabromocyclohexane.

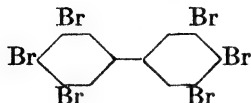
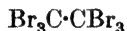
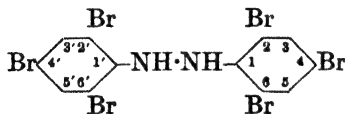
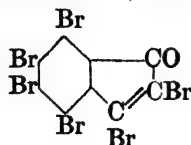
See Benzene hexabromide.

Hexabromocyclohexantrione-1 : 3 : 5.

See Hexabromophloroglucinol.

Hexabromodiketopentane.

See Hexabromoacetylacetone.

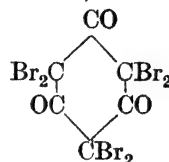
3 : 4 : 5 : 3' : 4' : 5'-Hexabromodiphenyl $C_{12}H_4Br_6$ MW, 628M.p. 248°. Sol. AcOH, C_6H_6 . Mod. sol. EtOH. $HNO_3 \rightarrow$ 2 : 2'-dinitro deriv.van Roosmalen, *Rec. trav. chim.*, 1934, **53**, 373.**Hexabromoethane (Perbromoethane)** C_2Br_6 MW, 504Prisms. Decomp. at 200–10° without melting. Spar. sol. Et_2O , EtOH. Sol. CS_2 .Biltz, *Ber.*, 1902, **35**, 1530.Mouneyrat, *Bull. soc. chim.*, 1898, **19**, 177.Dussol, *Bull. soc. chim.*, 1925, **37**, 161.**1 : 2 : 3 : 4 : 5 : 6-Hexabromo-*n*-hexane** $C_6H_8Br_6$ MW, 560M.p. 78°. Alc. KOH \rightarrow *dl*-mannitol.Pace, *Chem. Abstracts*, 1927, **21**, 1964.**2 : 4 : 6 : 2' : 4' : 6'-Hexabromohydrazobenzene** $C_{12}H_6N_2Br_6$ MW, 658Needles from EtOH.Aq. M.p. 126–7°. Sol. conc. H_2SO_4 with red col.v. Pechmann, Nold, *Ber.*, 1898, **31**, 564.Hunter, Sly, *J. Am. Chem. Soc.*, 1932, **54**, 3350.**Hexabromoindone-3 (Perbromoindone)** C_9OBr_6 MW, 604Yellow needles. M.p. 195–6°. Sol. AcOH, C_6H_6 . Insol. Et_2O , pet. ether.*Anilide*: red needles. M.p. 224° decomp.Zincke, *Ann.*, 1924, **435**, 172.

Dict. of Org. Comp.—II.

Hexabromonaphthalene $C_{10}H_2Br_6$ MW, 602

(i) Cryst. from toluene. M.p. 269°.

(ii) Needles from toluene. M.p. 312°.

Zelinsky, Turowa-Pollak, *Ber.*, 1929, **62**, 1659.**Hexabromophloroglucinol (Hexabromocyclohexantrione-1 : 3 : 5)** $C_6O_3Br_6$ MW, 600Plates from CS_2 -pet. ether. M.p. 146–7°. Very sol. Et_2O , $CHCl_3$, hot AcOH, C_6H_6 .Zinke, Kegel, *Ber.*, 1890, **23**, 1729.**Hexabromostearic Acid (Linolenic acid hexabromide)** $C_{18}H_{30}O_2Br_6$ MW, 758 α -Form :Micro-needles from C_6H_6 . M.p. 180–1° (185°). Spar. sol. EtOH, AcOH, $CHCl_3$, C_6H_6 . Zn \rightarrow α - and β -linolenic acids. Forms alkaloid salts.*Me ester*: $C_{19}H_{32}O_2Br_6$. MW, 772. M.p. 157–8°.*Et ester*: $C_{20}H_{34}O_2Br_6$. MW, 786. M.p. 151.5–152.5°.*Propyl ester*: $C_{21}H_{36}O_2Br_6$. MW, 800. M.p. 144–6°.*n-Butyl ester*: $C_{22}H_{38}O_2Br_6$. MW, 814. M.p. 143°.*Quinine salt*: m.p. 169°.*Strychnine salt*: m.p. 224–6°.*Morphine salt*: m.p. 185°.*Narcotine salt*: m.p. 184°. β -Form :Liq. Zn \rightarrow β -linolenic acid. γ -Form :Needles from C_6H_6 . M.p. 195–6° decomp. Sol. hot EtOH, hot AcOH. Spar. sol. EtOH, Et_2O , AcOH, $CHCl_3$, pet. ether. Insol. H_2O .Coffey, *J. Chem. Soc.*, 1921, **119**, 1308, 1410.Erdmann, Bedford, *Ber.*, 1909, **42**, 1329.Stanfield, Schierz, *J. Am. Chem. Soc.*, 1932, **54**, 4358.Vincente, West, *Chem. Abstracts*, 1928, **22**, 4105.Heiduschka, Lüft, *Arch. Pharm.*, 1919, **257**, 50.

Hexachloroacetone (Hexachloropropanone)

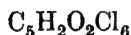
MW, 265

M.p. -2° . B.p. $202-4^\circ$. D_{12}^{20} 1.7444. Slightly sol. H_2O giving a monohydrate, m.p. 15° . H_2O at $120^\circ \rightarrow \text{CHCl}_3 + \text{CCl}_3\cdot\text{COOH}$. $\text{NH}_3 \rightarrow \text{CHCl}_3 + \text{CCl}_3\cdot\text{CO}\cdot\text{NH}_2$.

Cloëz, *Ann. chim. phys.*, 1886, **9**, 202.

Zaharia, *Chem. Zentr.*, 1896, **I**, 100.

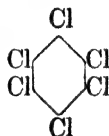
Hexachloroacetylacetone (1 : 1 : 1 : 5 : 5 : 5-Hexachloropentandione-2 : 4, 1 : 1 : 1 : 5 : 5 : 5-hexachloro-2 : 4-diketopentane)



MW, 307

B.p. $190-5^\circ/20$ mm.

Combes, *Ann. chim. phys.*, 1887, **12**, 236.

Hexachlorobenzene

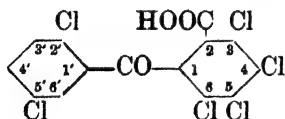
MW, 285

Needles from C_6H_6 -EtOH. M.p. 227° . B.p. $309-10^\circ/725$ mm. D_{23}^{25} 2.044, D_{23}^{26} 1.5691. Sublimes in long needles. Sol. Et_2O , CHCl_3 , C_6H_6 . Spar. sol. EtOH.

Graebe, *Ann.*, 1891, **263**, 30.

Fichter, Glantzstein, *Ber.*, 1916, **49**, 2477.

3 : 4 : 5 : 6 : 2' : 5'-Hexachlorobenzophenone-2-carboxylic Acid (o-[2 : 5-Dichlorobenzoyl]-2 : 3 : 4 : 5-tetrachlorobenzoic acid)



MW, 433

Cryst. from MeOH. M.p. $238-9^\circ$. Sol. EtOH. Hot conc. $\text{H}_2\text{SO}_4 \rightarrow$ 1 : 2 : 3 : 4 : 5 : 8-hexachloroanthraquinone.

Chloride: $\text{C}_{14}\text{H}_4\text{O}_2\text{Cl}_7$. MW, 451.5. Cryst. from AcOH. M.p. $181-4^\circ$.

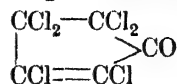
Hofmann, *Monatsh.*, 1915, **36**, 813.

Hexachlorocyclohexane.

See Benzene hexachloride.

Hexachlorocyclohexenedione-3 : 5.

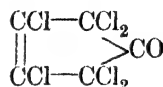
See Hexachlororesorcinol.

Hexachlorocyclopentenone-3

MW, 289

Plates. M.p. 28° . B.p. $162-3^\circ/75$ mm., $250.5-251^\circ/740.5$ mm. D_{20}^{20} 1.7616. n_D^{20} 1.56626.

Zinke, Küster, *Ber.*, 1890, **23**, 2213.

Hexachlorocyclopentenone-4

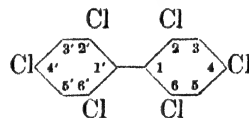
MW, 289

Cryst. from EtOH or AcOH. M.p. 92° . B.p. $148^\circ/75$ mm. Very sol. Et_2O , CHCl_3 , C_6H_6 . Sol. EtOH, AcOH. Sublimes in plates.

See previous reference.

Hexachlorodiketopentane.

See Hexachloroacetylacetone.

2 : 4 : 6 : 2' : 4' : 6'-Hexachlorodiphenyl

MW, 361

M.p. 112° . Sol. AcOH, C_6H_6 . Mod. sol. EtOH. Insol. ligroin.

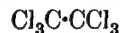
van Roosmalen, *Rec. trav. chim.*, 1934, **53**, 373.

Ullmann, *Ann.*, 1904, **332**, 56.

3 : 4 : 5 : 3' : 4' : 5'-Hexachlorodiphenyl.

M.p. 198° . Sol. AcOH, C_6H_6 . Mod. sol. EtOH. Sublimes. $\text{HNO}_3 \rightarrow$ 2 : 2'-dinitro deriv.

van Roosmalen, *Rec. trav. chim.*, 1934, **53**, 372.

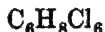
Hexachloroethane (Perchloroethane)

MW, 237

Exists in three cryst. modifications. Rhombohedra from EtOH-Et₂O. M.p. $186.8-187.4^\circ$ (sealed tube). B.p. $185.5^\circ/776.7$ mm. Heat of comb. C_p 110 Cal.

Hofmann, Seiler, *Ber.*, 1905, **38**, 3058.

Miller, *Ind. Eng. Chem.*, 1925, **17**, 1182.

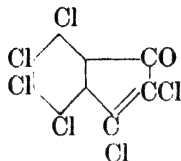
1 : 2 : 3 : 4 : 5 : 6-Hexachloro-*n*-hexane

MW, 293

Cryst. from pet. ether. M.p. 137.5°. B.p. 180-5°/30 mm. $[\alpha]_D + 18.5^\circ$ in C_6H_6 .

Mourques, *Compt. rend.*, 1890, 111, 112.

Hexachloroindone-3 (Perchloroindone)



C_9OCl_6 MW, 337

Golden-yellow leaflets from EtOH or AcOH. M.p. 148-9°. Sol. CS_2 , hot EtOH, hot AcOH. Spar. sol. Et_2O , $CHCl_3$, C_6H_6 , pet. ether. Oxime: m.p. 255° decomp.

Zinke, Pfaffendorf, *Ann.*, 1912, 394, 22.

Zinke, Fuchs, *Ber.*, 1893, 26, 521.

Hexachloroperylene

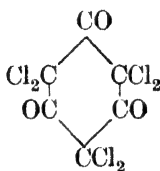
$C_{20}H_6Cl_6$ MW, 459

Yellow cryst. from $PhNO_2$. M.p. 356-7°. Very sol. aniline, Py, xylene, boiling $PhNO_2$. Spar. sol. EtOH, Et_2O , Me_2CO , AcOH. Sol. conc. H_2SO_4 with blue col.

Zinke, Pongratz, Funke, *Ber.*, 1925, 58, 332.

Zinke, Funke, Lorber, *Ber.*, 1927, 60, 580.

Hexachlorophloroglucinol (Hexachlorocyclohexantrione-1 : 3 : 5)



$C_6O_3Cl_6$ MW, 333

Plates. M.p. 48°. B.p. 268-9°, 150-1°/18-20 mm. Very sol. Et_2O , $CHCl_3$, CS_2 , C_6H_6 . $NH_3 \rightarrow$ dichloroacetamide.

Zinke, Kegel, *Ber.*, 1889, 22, 1473; 1890, 23, 230.

1 : 1 : 1 : 2 : 3 : 3-Hexachloropropane



$C_3H_2Cl_6$ MW, 251

B.p. 216°, 145°/90 mm. $D_4^{25} 1.6980$. $n_D^{17} 1.5250$. Alc. KOH \rightarrow 1 : 1 : 2 : 3 : 3-pentachloropropylene.

Prins, *J. prakt. Chem.*, 1914, 89, 417; D.R.P., 261,689, (*Chem. Zentr.*, 1913, II, 394).

1 : 1 : 2 : 2 : 3 : 3-Hexachloropropane



$C_3H_2Cl_6$ MW, 251

B.p. 218.5°. $D_4^{25} 1.7137$. $n_D^{18} 1.5262$. Alc. KOH \rightarrow 1 : 1 : 2 : 3 : 3-pentachloropropylene.

Prins, *J. prakt. Chem.*, 1914, 89, 422.

Hexachloropropylene (Hexachloropropene)



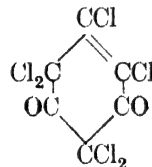
C_3Cl_6 MW, 249

B.p. 209-10°, 122-3°/50 mm., 99°/15 mm. $D_4^{20} 1.7652$. $n_D^{20} 1.5091$. Hot conc. $H_2SO_4 \rightarrow$ trichloroacrylic acid.

Böeseken, van der Scheer, de Voogt, *Rec. trav. chim.*, 1915, 34, 78.

Fritsch, *Ann.*, 1897, 297, 314.

Hexachlororesorcinol (Hexachlorocyclohexenedione-3 : 5)

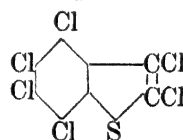


$C_6O_2Cl_6$ MW, 317

Plates or prisms from AcOH. M.p. 115°. B.p. 159-60°/13-15 mm. Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. pet. ether.

Zinke, Fuchs, *Ber.*, 1892, 25, 2687.

Hexachlorothionaphthene

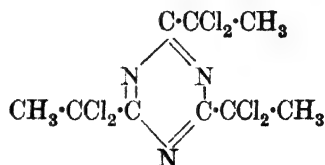


C_8Cl_6S MW, 341

Needles from ligroin. M.p. 158°.

Barger, Ewins, *J. Chem. Soc.*, 1908, 93, 2088.

Hexachlorotriethylcyanidine



$C_9H_9N_3Cl_6$ MW, 372

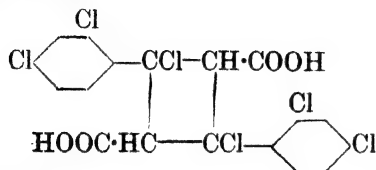
Polymer of 1 : 1-dichloropropionitrile. Plates from EtOH. M.p. 73.5°. Insol. H_2O . Sol. 7-17 parts EtOH at 26°. Decomp. on heating.

$\text{NH}_3 \rightarrow$ dichloropropionamide. $\text{K}_2\text{S} \rightarrow$ tri-thioacetylcyanidine.

Otto, Voigt, *J. prakt. Chem.*, 1887, **36**, 79.

Troeger, Hornung, *J. prakt. Chem.*, 1898, **57**, 357.

Hexachlorotruaxillic Acid (2 : 4-Dichloro-2 : 4-di[2 : 4-dichlorophenyl]-cyclobutane-1 : 3-dicarboxylic acid)



$\text{C}_{18}\text{H}_{10}\text{O}_4\text{Cl}_6$

MW, 503

α -Form :

Needles from EtOH. M.p. 316° . Dist. \rightarrow 2 : 4 : β -trichlorocinnamic acid.

Di-Me ester : $\text{C}_{20}\text{H}_{14}\text{O}_4\text{Cl}_6$. MW, 531. Needles from AcOH. M.p. 215° . Spar. sol. hot EtOH.

Di-Et ester : $\text{C}_{22}\text{H}_{18}\text{O}_4\text{Cl}_6$. MW, 559. Cryst. from CHCl_3 . M.p. 178° .

γ -Form :

Needles from EtOH. M.p. 285° . Sol. EtOH, AcOH, hot C_6H_6 . Dist. \rightarrow 2 : 4 : β -trichlorocinnamic acid.

Di-Me ester : needles from EtOH. M.p. $180-2^\circ$. Sol. hot. MeOH, EtOH.

Krauss, *Ber.*, 1904, **37**, 219.

Hexacontane



$\text{C}_{60}\text{H}_{122}$

MW, 842

Cryst. from butyl acetate. M.p. $98.5-99.3^\circ$. B.p. 250° .

Carothers, Hill, Kirby, Jacobson, *J. Am. Chem. Soc.*, 1930, **52**, 5279.

Hexacosane



$\text{C}_{26}\text{H}_{54}$

MW, 366

Cryst. from Et_2O . M.p. 56.1° (56.5° , $59-60^\circ$). B.p. $262^\circ/15$ mm., $199^\circ/0.4$ mm. n_D^{25} 1.43332. Sol. C_6H_6 . Spar. sol. EtOH.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 528.

Garner, van Bibber, King, *J. Chem. Soc.*, 1931, 1537.

Hexacosanic Acid (See Cerotic Acid. This name is sometimes given to the pure hexacosanic acid)



$\text{C}_{26}\text{H}_{52}\text{O}_2$

MW, 396

Constituent of various oils and waxes, e.g., beeswax, Chinese insect wax, montan wax. M.p. $87.7-87.9^\circ$ ($88-9^\circ$). D_4^{100} 0.8198. n_D^{100} 1.4301.

Et ester : $\text{C}_{28}\text{H}_{56}\text{O}_2$. MW, 424. M.p. $59.5-59.8^\circ$.

Anhydride : $\text{C}_{52}\text{H}_{102}\text{O}_3$. MW, 774. M.p. $89.3-89.5^\circ$. D_4^{100} 0.8188. n_D^{100} 1.4337.

Nitrile : pentacosyl cyanide. $\text{C}_{26}\text{H}_{51}\text{N}$. MW, 377. M.p. $61-2^\circ$.

Levene, Taylor, *J. Biol. Chem.*, 1924, **59**, 905.

Bleyberg, Ulrich, *Ber.*, 1931, **64**, 2512.

Hexacosanol.

Ceryl Alcohol, *q.v.*

Hexacosyl iodide (Ceryl iodide, iodohecosane)



$\text{C}_{26}\text{H}_{53}\text{I}$

MW, 492

M.p. $58.2-58.5^\circ$.

Bleyberg, Ulrich, *Ber.*, 1931, **64**, 2512.

Hexacyanogen.

See Cyanuric cyanide.

Hexadecanal.

See Palmitic Aldehyde.

n-Hexadecane (Cetane)



$\text{C}_{16}\text{H}_{34}$

MW, 226

Cryst. from Me_2CO . M.p. 18.13° . B.p. $105-10^\circ/0.1$ mm.

Carey, Smith, *J. Chem. Soc.*, 1933, 346.

Hexadecanol-1.

See Cetyl Alcohol.

Hexadecanol-3.

See Ethyltridecylcarbinol.

Hexadecanone-2.

See Methyl tetradecyl Ketone.

Hexadecanone-3.

See Ethyl tridecyl Ketone.

1-Hexadecenoic Acid.

See Gaidic Acid

Hexadecylacetylene (Cetylacetylene, octadecene-1)



$\text{C}_{18}\text{H}_{34}$

MW, 250

Cryst. from EtOH. M.p. 22.5° (26°). B.p. $180^\circ/15$ mm. D_4^0 0.8696.

Picon, *Compt. rend.*, 1919, **169**, 32.

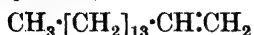
Krafft, Reuter, *Ber.*, 1892, **25**, 2248.

n-Hexadecyl Alcohol.

See Cetyl Alcohol.

n-Hexadecylamine.

See Cetylamine.

1-Hexadecylene (*Hexadecene, cetylene, cetene*)

$\text{C}_{16}\text{H}_{32}$ MW, 224
M.p. 2-2°. B.p. 157-5°/15 mm., 152-4°/13 mm. D_4^{20} 0.7825. n_D^{20} 1.4419.

Waterman, van't Spijker, van Westen,
Rec. trav. chim., 1929, **48**, 1103.

Landa, *Bull. soc. chim.*, 1928, **43**, 1087.

Hexadecylenic Acid.

See Gaidic Acid.

Hexadecylic Acid.

See Palmitic Acid.

Hexadecylic Aldehyde.

See Palmitic Aldehyde.

1 : 3-Hexadienal.

See Sorbic Aldehyde.

1 : 2-Hexadiene (*Propylallene, butylidene-ethylene*)

C_6H_{10} MW, 82
B.p. 78°. D_4^{17} 0.7198. n_D^{17} 1.4298. Does not form Cu deriv. $\text{HgCl}_2 \rightarrow$ white ppt.

Bouis, *Ann. chim.*, 1928, **9**, 441.

Bourguet, Piaux, *Bull. soc. chim.*, 1932, **51**, 1047.

1 : 3-Hexadiene (*3-Propylidene-propylene, 1-vinylbutylene-1, 1-ethyl-1 : 3-butadiene*)

C_6H_{10} MW, 82
B.p. 72-5°. D_4^{13} 0.7152. n_D^{12} 1.4416.
Tetrabromide : 1 : 2 : 3 : 4-tetrabromohexane.
M.p. 19°.

Prévost, *Ann. chim.*, 1928, **10**, 176.

1 : 5-Hexadiene.

See Diallyl.

2 : 4-Hexadiene.

See Dipropenyl.

2 : 4-Hexadiene-2-carboxylic Acid.

See 1-Methylsorbic Acid.

2 : 4-Hexadienol-1 (*3-Propenylallyl alcohol, 4-ethylidenecrotonyl alcohol, sorbyl alcohol*)

$\text{C}_6\text{H}_{10}\text{O}$ MW, 98
Needles. M.p. 30.5-31.5°. B.p. 76-7°/12 mm.
Volatile in steam.

Diphenylurethane : cryst. from pet. ether.
M.p. 78-9°.

3 : 5-Dinitrobenzoyl : yellow needles from pet. ether. M.p. 85°.

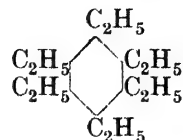
Reichstein, Ammann, Trivelli, *Helv. Chim. Acta*, 1932, **15**, 264.

1 : 5-Hexadienol-3.

See Vinylallylcarbinol.

Hexadi-ine.

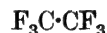
See Dipropargyl.

Hexa-ethylbenzene

$\text{C}_{18}\text{H}_{30}$ MW, 246

Cryst. from EtOH. M.p. 129°. B.p. 298°. D^{130} 0.830.

Wertyporoch, Firla, *Ann.*, 1933, **500**, 293.

Hexafluoroethane

C_2F_6 MW, 138

M.p. -106.3°. B.p. -79 to -78.6°. Crit. temp. 19.7°. 28.3 c.cs dissolve in 100 c.cs abs. EtOH. 66.2 c.cs dissolve in 100 c.cs CCl_4 . Supports comb. of Na and Mg.

Swarts, *Bull. soc. chim. Belg.*, 1933, **42**, 114.

Ruff, Bretschneider, *Z. anorg. allgem. Chem.*, 1933, **210**, 173, (*Chem. Abstracts*, 1933, **27**, 2131).

Frigidaire Corporation, E.P., 389,619, (*Chem. Zentr.*, 1933, II, 131).

Hexahydroacetanilide.

See under Cyclohexylamine.

Hexahydroacetophenone.

See Acetocyclohexane.

Hexahydro-o-aminoethylbenzene.

See 2-Ethylcyclohexylamine.

Hexahydroaniline.

See Cyclohexylamine.

Hexahydroanisole.

See under Cyclohexanol.

Hexahydroanthracene

$\text{C}_{14}\text{H}_{16}$ MW, 184

Needles from 50% EtOH. M.p. 60-1°. Very sol. EtOH.

Clemmensen, *Ber.*, 1914, **47**, 685.

 β -Hexahydroanthracene

$\text{C}_{14}\text{H}_{16}$ MW, 184

Plates. M.p. 66.5°. B.p. 303-6°. Very sol. hot Et_2O , AcOH, C_6H_6 .

Godchot, *Ann. chim. phys.*, 1907, **12**, 504.

 γ -Hexahydroanthracene

$\text{C}_{14}\text{H}_{16}$ MW, 184

Plates. M.p. 63°. B.p. 290°. Very sol. EtOH, Et₂O, C₆H₆. HNO₃ → anthracene-9:10-dihydride.

See previous reference.

Hexahydroanthrahydroquinone

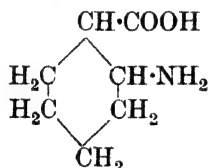
C₁₄H₁₆O₂ MW, 216

White needles from EtOH. M.p. 229–30°.

Diacetyl: white needles from EtOH. M.p. 212–14° (215–16°).

Skita, *Ber.*, 1925, **58**, 2695; *Ber.*, 1927, **60**, 2526.

Hexahydroanthranilic Acid (*o*-Aminohexahydrobenzoic acid, aminocyclohexane-*o*-carboxylic acid)



C₇H₁₃O₂N MW, 143

Needles from dil. EtOH. M.p. 274° decomp. Prac. insol. EtOH, Et₂O. HNO₂ → hexahydrosalicylic acid.

B, HCl: m.p. 203–4° (188–90°).

Et ester: C₉H₁₇O₂N. MW, 171. B.p. 148–51°/30 mm. Sol. H₂O, EtOH. Decomp. on standing in air. *Hydrochloride*: m.p. 156°. Sol. H₂O.

Amide: C₇H₁₄ON₂. MW, 142. Needles. M.p. 153–4°. Sol. H₂O. Insol. Et₂O, C₆H₆. *Hydrobromide*: m.p. 257–9°.

Einhorn, Meyenberg, *Ber.*, 1894, **27**, 2470.

Einhorn, Bull, *Ann.*, 1897, **295**, 207.

Houben, Pfau, *Ber.*, 1916, **49**, 2298.

Hexahydroanthraquinone

C₁₄H₁₄O₂ MW, 214

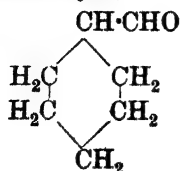
Yellow needles from MeOH. M.p. 170° (175°).

Dibromide: yellow prisms from MeOH. M.p. 118°.

Diacetyl: cryst. from AcOH or EtOH. M.p. 204–6°.

Skita, *Ber.*, 1925, **58**, 2694; 1927, **60**, 2526.

Hexahydrobenzaldehyde (*Aldehydocyclohexane, cyclohexyl aldehyde*)



C₇H₁₂O

MW, 112

B.p. 159.3°, 75–8°/20 mm. D₄²⁰ 0.945. n_D²⁰ 1.4495.

Diethylacetal: b.p. 109–10°/20 mm.

Oxime: needles from pet. ether. M.p. 90–1°.

Hydrochloride: m.p. 107–8° decomp.

Semicarbazone: cryst. from H₂O. M.p. 176° (167–8°).

Wallach, Isaac, *Ann.*, 1906, **347**, 331.

Wood, Comley, *J. Soc. Chem. Ind.*, 1923, **42**, 249T.

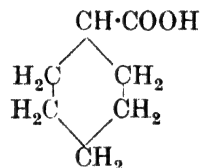
Hexahydrobenzanilide.

See under Cyclohexylamine.

Hexahydrobenzene.

See Cyclohexane.

Hexahydrobenzoic Acid (*Cyclohexane-carboxylic acid*)



C₇H₁₂O₂ MW, 128

Prisms. M.p. 29–30°. B.p. 232–3°, 105–6°/4 mm., 115–17°/13 mm. D₄²⁵ 1.0251. n_D²⁵ 1.4520. k = 1.32 × 10⁻⁵ at 25°. Very sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O.

Me ester: C₈H₁₄O₂. MW, 142. B.p. 183°, 73°/15 mm. D₄¹⁵ 0.9954. n_D¹⁵ 1.45372.

Et ester: C₉H₁₆O₂. MW, 156. B.p. 196, 82–3°/12 mm. D₄¹⁵ 0.9672. n_D¹⁵ 1.45012.

Chloride: hexahydrobenzoyl chloride, C₇H₁₁OCl. MW, 146.5. B.p. 179–80° (184°), 76°/17 mm. D₄¹⁵ 1.0962. n_D¹⁵ 1.47662.

Amide: hexahydrobenzamide. C₇H₁₃ON. MW, 127. Prisms from H₂O. M.p. 185–6°. Very sol. EtOH, Et₂O.

Anhydride: C₁₄H₂₂O₃. MW, 238. Cryst. M.p. 25°. B.p. 280–3°. D₄¹⁵ 1.0585. n_D¹⁵ 1.48189.

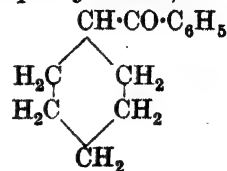
Nitrile: hexahydrobenzonitrile. C₇H₁₁N. MW, 109. B.p. 184–5°, 75–7°/16 mm. D₄²⁵ 0.913. n_D²⁵ 1.453.

Lumsden, *J. Chem. Soc.*, 1905, **87**, 90.

Hiers, Adams, *J. Am. Chem. Soc.*, 1926, **48**, 2392.

Grignard, Bellet, Courtot, *Ann. chim.*, 1919, **12**, 368.

Hexahydrobenzophenone (*Benzoylcyclohexane, cyclohexyl phenyl ketone*)



C₁₃H₁₆O

MW, 188

Needles from pet. ether. M.p. 59–60° (54°).

Semicarbazone: m.p. 175° (168–9°).

Oxime: *syn*:- needles from EtOH. M.p. 158.

Anti:- prisms from EtOH. M.p. 111°.

Moureu, Mignonac, *Ann. chim.*, 1920, **14**, 335.

Meyer, Scharvin, *Ber.*, 1897, **30**, 1942.

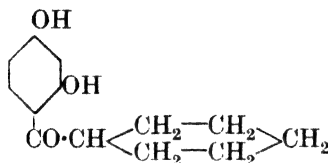
Hexahydrobenzoylaminoacetic Acid.

See Hexahydrohippuric Acid.

Hexahydrobenzoylglycine.

See Hexahydrohippuric Acid.

4-Hexahydrobenzoylresorcinol (*Cyclohexyl 2:4-dihydroxyphenyl ketone*, *2:4-dihydroxybenzoylcyclohexane*, *β-resorcylicyclohexane*)



$C_{13}H_{16}O_3$

MW, 220

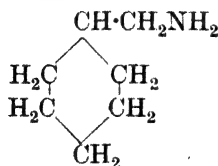
Cryst. from $CHCl_3$ -ligroin. M.p. 115.5–116°. B.p. 200–2°/4 mm.

Talbot, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2040.

Hexahydrobenzyl Alcohol.

See Cyclohexylcarbinol.

Hexahydrobenzylamine (*Cyclohexylmethylamine*, *ω-aminohexahydrotoluene*)



$C_7H_{15}N$

MW, 113

B.p. 163.5°. D_4^{25} 0.8747 (D_4^{20} 0.8702). n_D^{25} 1.4646.

N-Benzoyl: cryst. from EtOH.Aq. M.p. 98° (107–8°).

B.HCl: plates from H_2O . M.p. about 254°.

B.HAuCl₄: yellow needles. M.p. 183°.

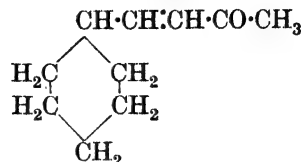
Picrate: yellow plates. M.p. about 184–6°.

Wallach, *Ann.*, 1907, **353**, 298.

Gutt, *Ber.*, 1907, **40**, 2068.

Skita, *Ber.*, 1924, **57**, 1977.

Hexahydrobenzylideneacetone (*1-Cyclohexyl-2-acetylene, methyl hexahydrostyryl ketone*, *ω-acetohexahydrostyrene*)



$C_{10}H_{16}O$

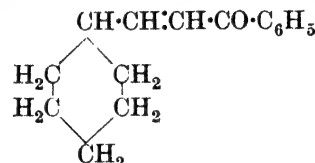
MW, 152

B.p. 230–2°, 112–16°/17 mm., 103°/9 mm.

Semicarbazone: m.p. 168°.

Kon, *J. Chem. Soc.*, 1926, 1798.

Hexahydrobenzylideneacetophenone (*Hexahydrobenzalacetophenone*, *ω-benzylhexahydrostyrene*, *phenyl hexahydrostyryl ketone*)



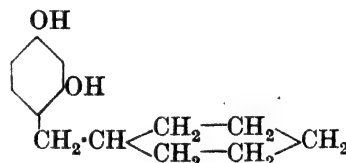
$C_{15}H_{18}O$

MW, 214

Needles from EtOH. M.p. 167–8°. Very sol. Et_2O , Me_2CO . Sol. EtOH.

Frézouls, *Compt. rend.*, 1912, **154**, 1707.

4-Hexahydrobenzylresorcinol (*2:4-Dihydroxy-ω-cyclohexyltoluene*, *cyclohexyl-2:4-dihydroxyphenyl-methane*, *2:4-dihydroxybenzylcyclohexane*)



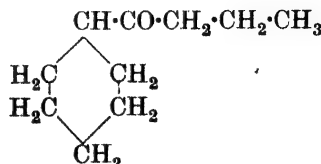
$C_{13}H_{18}O_2$

MW, 206

Cryst. from $CHCl_3$. M.p. 116.5–117.5°.

Talbot, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2040.

Hexahydrobutyrophenone (*Propyl cyclohexyl ketone*, *butyrylcyclohexane*)



$C_{10}H_{18}O$

MW, 154

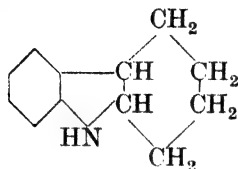
B.p. 94°/13 mm.

Semicarbazone : m.p. 155°.

Douris, *Compt. rend.*, 1913, **157**, 57.

Darzens, Rost, *Compt. rend.*, 1911, **153**, 774.

Hexahydrocarbazole (Carbazoline)



$C_{12}H_{15}N$

MW, 173

Cis:

Needles from EtOH. M.p. 99°. B.p. 280°/769 mm. Sol. EtOH, Et₂O, C₆H₆, dil. HCl.

Acetyl : m.p. 98°.

Benzoyl : colourless needles from EtOH. M.p. 106°. B.p. 270°/10 mm.

Picrate : yellow needles. M.p. 166°.

Trans:

Colourless needles from EtOH. M.p. 127°. B.p. 286°/769 mm. Readily sol. dil. HCl.

Acetyl : long needles from EtOH.Aq. M.p. 113°.

Benzoyl : colourless needles from EtOH. M.p. 133°.

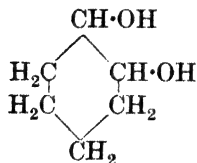
Picrate : yellow needles from EtOH. M.p. 179°.

Gurney, Perkin, Plant, *J. Chem. Soc.*, 1927, **130**, 2676.

Hexahydrocarvacrol.

See Carvomenthol.

Hexahydrocatechol (Cyclohexane-1 : 2-diol, 1 : 2-dihydroxycyclohexane)



$C_6H_{12}O_2$

MW, 116

Cis:

Cryst. from Et₂O. M.p. 98°. B.p. 116°/13 mm.

Acetone comp. : b.p. 182°, 78°/24 mm. D_4^{20} 0.980. n_D^{20} 1.4479.

Diacetyl : b.p. 118°/13 mm. $D_4^{19.5}$ 1.0836. $n_D^{19.5}$ 1.4429.

Dibenzoyl : m.p. 63.5°.

Di-phenylurethane : m.p. 185°.

Trans:

Cryst. from Me₂CO. M.p. 104°. B.p. 117°/13 mm.

Diacetyl : b.p. 113°/11.5 mm. D_4^{20} 1.077. n_D^{20} 1.4464.

Dibenzoyl : m.p. 94.5° (92°).

Di-phenylurethane : m.p. 212°.

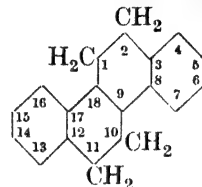
Rothstein, *Ann. chim.*, 1930, **14**, 461.

Auwers, Dersch, *J. prakt. Chem.*, 1930, **124**, 235.

Lindemann, Lange, *Ann.*, 1930, **483**, 31.

Schering-Kahlbaum, D.R.P., 574,838, (*Chem. Abstracts*, 1933, **27**, 4540).

1 : 2 : 9 : 10 : 11 : 18-Hexahydrochrysene



$C_{18}H_{18}$

MW, 234

Cis:

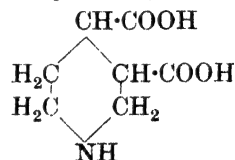
Prisms from EtOH. M.p. 75°. B.p. 208°/12 mm.

Trans:

Prisms from butanol-EtOH. M.p. 115°. B.p. 223°/12 mm.

Ramage, Robinson, *J. Chem. Soc.*, 1933, 609.

Hexahydrocinchomeronic Acid (Piperidine-3 : 4-dicarboxylic acid)



$C_7H_{11}O_4N$

MW, 173

Mixture of *cis* and *trans*. Cryst. from H₂O. M.p. 256° decomp. Spar. sol. H₂O.

B,HCl : m.p. 237° decomp. Very spar. sol. H₂O. Sol. EtOH.

B,HAuCl₄ : m.p. 205° decomp.

Heat with KOH → stable form. Also obtained in a similar manner from leuponic acid (*q.v.*).

Stable form : Cryst. from H₂O. M.p. 268-70° decomp. 275° (rapid heat.).

B,HCl : m.p. 240-2° decomp. Very sol. H₂O.

B,HAuCl₄ : m.p. 205° decomp.

Koenigs, Wolff, *Ber.*, 1896, **29**, 2187.

Koenigs, *Ber.*, 1897, **30**, 1326.

Hexahydrocresol.

See Methylcyclohexanol.

Hexahydrocumene.

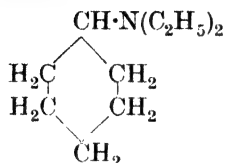
See Isopropylcyclohexane.

Hexahydro- ψ -cumene.

See 1 : 2 : 4-Trimethylcyclohexane.

Hexahydrocymene.

See Menthane.

Hexahydrodiethylaniline (*Diethylcyclohexylamine*) $\text{C}_{10}\text{H}_{21}\text{N}$

MW, 155

B.p. 191° (193°). D_4^{20} 0.872.Picrate : cryst. M.p. $91-2^\circ$.Darzens, *Compt. rend.*, 1909, **149**, 1003.Skita, Berendt, *Ber.*, 1919, **52**, 1527.**Hexahydrodiphenyl.**

See Phenylcyclohexane.

Hexahydrodurene.

See 1 : 2 : 4 : 5-Tetramethylcyclohexane.

Hexahydroethylaniline.See *N*-Ethylcyclohexylamine.**Hexahydroethylcresol.**

See Methylcyclohexanol.

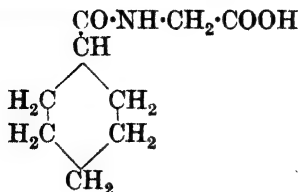
Hexahydroethyltoluene.

See Methylcyclohexane.

Hexahydrofluorene $\text{C}_{13}\text{H}_{16}$

MW, 172

Constituent of certain coal oils. Oily liq. with violet fluor. B.p. $240-50^\circ$, $110-20^\circ/10$ mm. D_4^{20} 0.945. Sol. Et_2O , AcOH , C_6H_6 , CHCl_3 . Spar. sol. EtOH , pet. ether. Insol. H_2O . Spar. volatile in steam. Polymerises on long boiling. Ox. \longrightarrow acetic, propionic, adipic, and oxalic acids.

Pictet, Ramseyer, *Ber.*, 1911, **44**, 2491.Pictet, *Ann. chim. phys.*, 1918, [9], **10**, 275, 303.**Hexahydrohippuric Acid** (*Hexahydrobenzoylglycine, hexahydrobenzoylaminoacetic acid*) $\text{C}_9\text{H}_{15}\text{O}_3\text{N}$ MW, 185 $\text{C}_{10}\text{H}_{18}\text{O}$

Needles from H_2O . M.p. 152° . Sol. H_2O , EtOH , hot Et_2O .

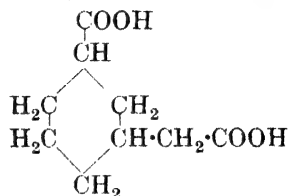
Me ester : $\text{C}_{10}\text{H}_{17}\text{O}_3\text{N}$. MW, 199. Needles. M.p. $100-1^\circ$.

Et ester : $\text{C}_{11}\text{H}_{19}\text{O}_3\text{N}$. MW, 213. Needles. M.p. $75-6^\circ$.

Amide : $\text{C}_9\text{H}_{16}\text{O}_2\text{N}_2$. MW, 184. Cryst. from H_2O . M.p. $195-6^\circ$.

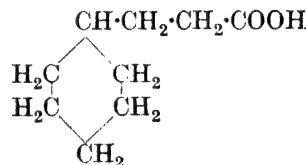
Godehot, *Bull. soc. chim.*, 1911, **9**, 262.**Hexahydrohomocatechol.**

See 4-Methylcyclohexandiol-1 : 2.

Hexahydrohomoisophthalic Acid (*3-Carboxycyclohexylacetic acid, 3-carboxymethylhexahydrobenzoic acid*) $\text{C}_9\text{H}_{14}\text{O}_4$

MW, 186

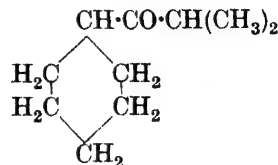
Needles from H_2O . M.p. 158° . Sol. Me_2CO . Spar. sol. C_6H_6 , pet. ether. Stable to cold KMnO_4 . Distilled over $\text{Ca}(\text{OH})_2 \longrightarrow$ bicyclo-1 : 2 : 3-octanone-6.

Komppe, Hirn, *Ber.*, 1903, **36**, 3611.**Hexahydro-hydrocinnamic Acid** (*2-Hexahydrophenylpropionic acid, 2-cyclohexylpropionic acid*) $\text{C}_9\text{H}_{16}\text{O}_2$

MW, 156

B.p. $275-8^\circ$, $143.5^\circ/11$ mm. D_4^{20} 0.9966. n_D^{20} 1.4634. $k = 1.34 \times 10^{-5}$.

Amide : $\text{C}_9\text{H}_{17}\text{ON}$. MW, 155. Needles from MeOH . M.p. 120° .

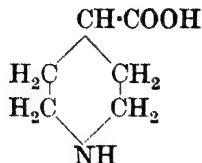
Ipatiew, *Ber.*, 1909, **42**, 2097.Zelinsky, *Ber.*, 1908, **41**, 2676.**Hexahydroisobutyrophenone** (*Isopropylcyclohexyl ketone, isobutyrylcyclohexane*)

MW, 154

B.p. 83°/11 mm.

Faworski, Charitonowa, *J. prakt. Chem.*, 1913, **88**, 695.

Hexahydroisonicotinic Acid (*Piperidine-4-carboxylic acid, isonipecotic acid*)



$C_6H_{11}O_2N$ MW, 129

Needles from H_2O . M.p. above 320°. Sol. H_2O . Insol. EtOH.

B, HCl : m.p. 293° decomp.

Me ester: $C_7H_{13}O_2N$. MW, 143. *Hydrochloride*: m.p. 169°.

B_2, H_2PtCl_6 : m.p. 239–40° decomp.

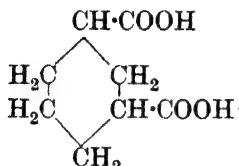
Nitroso deriv.: needles. M.p. 101°.

p-Toluenesulphonyl: m.p. 170°.

Freudenberg, *Ber.*, 1918, **51**, 1673.

Hanousek, Prelog, *Chem. Abstracts*, 1932, **26**, 5302.

Hexahydroisophthalic Acid (*Cyclohexane-1:3-dicarboxylic acid*)



$C_8H_{12}O_4$ MW, 172

Cis:

Needles from conc. HCl. M.p. 187–9°. Very sol. H_2O , EtOH, C_6H_6 . Sol. Et_2O . Spar. sol. pet. ether. $k = 5.34 \times 10^{-5}$ at 25°. Conc. HCl at 180° \rightarrow *trans*-form.

Di-Me ester: $C_{10}H_{16}O_4$. MW, 200. B.p. 263°. D_4^{20} 1.048. n_D^{20} 1.452.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 288°, 142°/11 mm. D_4^{20} 1.045. n_D^{20} 1.452.

Anhydride: $C_8H_{10}O_3$. MW, 154. B.p. 304°.

Dianilide: m.p. 298–9°.

Trans:

dl.:

Needles from H_2O . M.p. 148°. Sol. hot H_2O . $k = 3.45 \times 10^{-5}$ at 25°. Heat with $CH_3COCl \rightarrow$ anhydride of *cis*-form.

Di-Et ester: b.p. 142°/12 mm. D_4^{20} 1.047. n_D^{20} 1.453.

d.:

M.p. 134°. $[\alpha]_D^{25} + 23.46^\circ$.

l.:

M.p. 134°. $[\alpha]_D^{25} - 23.10^\circ$.

Böeseken, Peek, *Rec. trav. chim.*, 1925, **44**, 841.

Goodwin, Perkin, *J. Chem. Soc.*, 1905, **87**, 848.

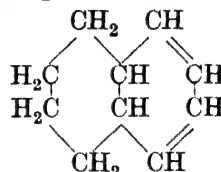
Baeyer, Villiger, *Ann.*, 1893, **276**, 259.

Willstätter, Jaquet, *Ber.*, 1918, **51**, 777.

Hexahydromesitylene.

See 1:3:5-Trimethylcyclohexane.

Hexahydronaphthalene



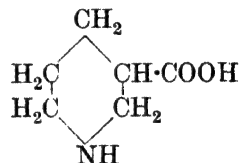
$C_{10}H_{14}$ MW, 134

B.p. 200°. D_4^{25} 0.934. $n_D^{16.4}$ 1.526.

Agrestini, *Gazz. chim. ital.*, 1882, **12**, 495.

Lossen, Zander, *Ann.*, 1884, **225**, 112.

Hexahydronicotinic Acid (*Piperidine-3-carboxylic acid, nipecotic acid*)



$C_6H_{11}O_2N$ MW, 129

Cryst. M.p. 261° decomp. Sol. H_2O . Insol. EtOH, Et_2O .

B, HCl : cryst. M.p. 240–1° decomp.

B_2, H_2PtCl_6 : m.p. 228–9° decomp.

N-Acetyl: m.p. 289–90° decomp. *p-Toluenesulphonyl*: m.p. 167°.

Me ester: $C_7H_{13}O_2N$. MW, 143. Needles. M.p. 215–17°. Sol. H_2O , EtOH. B, HCl : m.p. 131–2°. B_2, H_2PtCl_6 : m.p. 207–8°.

Et ester: $C_8H_{15}O_2N$. MW, 157. B.p. 102–4°/7 mm. D_4^{20} 1.0121. n_D^{20} 1.4592. B, HCl : m.p. 110–11°.

Nitroso deriv.: prisms from H_2O . M.p. 111–12°.

N-Me deriv.: methylpiperidine-3-carboxylic acid. $C_7H_{13}O_2N$. MW, 143. Cryst. + $1H_2O$. M.p. anhyd. 162–3°. B, H_2PtCl_6 : prisms, m.p. 215–16°. B, H_2AuCl_4 : m.p. 158–9°. *Me ester*: $C_8H_{15}O_2N$. MW, 157. Liq. Misc. with H_2O , EtOH, Et_2O . B_2, H_2PtCl_6 : m.p. 233–5°.

Freudenberg, *Ber.*, 1918, **51**, 1668.

McElvain, Adams, *J. Am. Chem. Soc.*, 1923, **45**, 2738.

Jahns, *Arch. Pharm.*, 1891, **229**, 686.

Hexahydروperylene $C_{20}H_{18}$

MW, 258

Leaflets. M.p. 183–4° (189°). Sublimes on careful heating. Dist. → perylene. Red sol. in conc. H_2SO_4 .

Zinke, Unterkreuter, *Monatsh.*, 1920, **40**, 405.

Zinke, Schniderschitsch, *Monatsh.*, 1929, **51**, 282.

Hexahydrophenanthrene $C_{14}H_{16}$

MW, 184

Exists in two forms according to method of preparation.

(i) By hydrogen reduction. Yellowish liq. M.p. – 3°. B.p. 307°, 167°/13 mm. D^{18}_4 1.043. n^{15}_D 1.580. Sol. Et_2O , AcOH, C_6H_6 , $CHCl_3$. Spar. sol. EtOH.

Picrate: m.p. 106°.

(ii) By hydriodic acid reduction. M.p. – 8°. B.p. 290°. D^{20}_4 1.045. n^{20}_D 1.57. Sol. Et_2O , AcOH, C_6H_6 , CS_2 , pet. ether. Spar. sol. EtOH. Does not form a picrate.

Schmidt, Mezger, *Ber.*, 1907, **40**, 4252.

Breteau, *Compt. rend.*, 1905, **140**, 942.

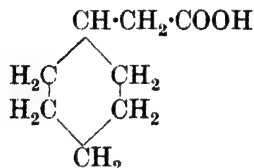
Hexahydrophenetole.

See under Cyclohexanol.

Hexahydrophenol.

See Cyclohexanol.

Hexahydrophenylacetic Acid (Cyclohexylacetic acid)

 $C_8H_{14}O_2$

MW, 142

Needles from formic acid. M.p. 33° (27°). B.p. 244–6°, 156°/40 mm., 135°/13 mm., 117°/5 mm. D^{23}_4 0.9985, D^{78}_4 0.9671. n^{78}_D 1.438. $k = 2.36 \times 10^{-5}$. Sol. most org. solvents. Spar. sol. H_2O .

Me ester: $C_9H_{16}O_2$. MW, 156. B.p. 200–2°. D^{14}_4 0.9896. n^{14}_D 1.459.

Et ester: $C_{10}H_{18}O_2$. MW, 170. B.p. 211–12°, 100°/17 mm. D^{14}_4 0.9537. n^{14}_D 1.451.

Amide: $C_8H_{15}ON$. MW, 141. Cryst. from MeOH.Aq. M.p. 171–2°.

Nitrile: $C_8H_{13}N$. MW, 123. B.p. 215°. D^{18}_4 0.913. n^{18}_D 1.457.

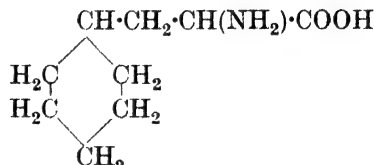
Chloride: $C_8H_{13}OCl$. MW, 160.5. B.p. 98–100°/23 mm.

Sabatier, Murat, *Compt. rend.*, 1913, **156**, 425.

Darzens, Rost, *Compt. rend.*, 1911, **153**, 774.

Wallach, *Ann.*, 1908, **359**, 311.

Hexahydrophenyl- α -alanine (1-Amino-2-cyclohexylpropionic acid, 2-cyclohexyl- α -alanine)

 $C_9H_{17}O_2N$

MW, 171

l-.

Needles from H_2O . M.p. 324°. $[\alpha]^{20}_D + 13.3^\circ$. Sol. H_2O , EtOH. Insol. Et_2O .

B.HCl: m.p. 246°. $[\alpha]^{20}_D + 13.4^\circ$.

Me ester: $C_{10}H_{19}O_2N$. MW, 185. *N-Benzoyl*: m.p. 104–5°.

Et ester: $C_{11}H_{21}O_2N$. MW, 199. B.p. 149–50°/11 mm. *Hydrochloride*: m.p. 196°.

N-Benzoyl: m.p. 124–5°. $[\alpha]^{20}_D - 12.68^\circ$.

N-p-Nitrobenzoyl: m.p. 158–9°.

d-.

B.HCl: m.p. 246°. $[\alpha]^{20}_{550.3} - 10.16^\circ$.

dl-.

B.HCl: m.p. 246°.

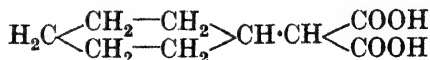
Karrer, Kehl, *Helv. Chim. Acta*, 1930, **13**, 58.

Waser, Brauchli, *Helv. Chim. Acta*, 1924, **7**, 751.

Hexahydrophenylenediamine.

See Diaminocyclohexane.

Hexahydrophenylmalonic Acid (Cyclohexylmalonic acid)

 $C_9H_{14}O_4$

MW, 186

Prisms from formic acid. M.p. 176–8° decomp. Sol. Et_2O . Spar. sol. H_2O , $CHCl_3$. Insol. C_6H_6 , pet. ether.

Di-Me ester: $C_{11}H_{18}O_4$. MW, 214. B.p. 121–2°/6 mm. D^{24}_4 1.074.

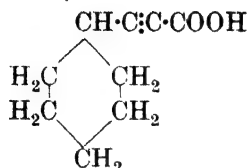
Di-Et ester: $C_{13}H_{22}O_4$. MW, 242. B.p. 151–3°/16 mm. D^{20}_4 1.028. n^{20}_D 1.449.

Et ester-nitrile: $C_{11}H_{17}O_2N$. MW, 195. B.p. 158–61°/24 mm.

Hope, Perkin, *J. Chem. Soc.*, 1909, **95**, 1363.

Freundler, Damond, *Compt. rend.*, 1905, **141**, 594.

Hexahydrophenylpropionic Acid (*Cyclohexylpropionic acid*)



$C_9H_{12}O_2$ MW, 152

B.p. 138–40°/6 mm.

Me ester: $C_{10}H_{14}O_2$. MW, 166. B.p. 96°/5 mm.

Et ester: $C_{11}H_{16}O_2$. MW, 180. B.p. 105°/5 mm.

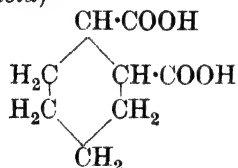
Darzens, Rost, *Compt. rend.*, 1909, **149**, 682.

Jegorowa, *J. Russ. Phys.-Chem. Soc.*, 1911, **43**, 1122.

2-Hexahydrophenylpropionic Acid.

See Hexahydro-hydrocinnamic Acid.

Hexahydrophthalic Acid (*Cyclohexane-1:2-dicarboxylic acid*)



$C_8H_{12}O_4$ MW, 172

Cis:

Needles from EtOH. M.p. 192°. Sol. H_2O , EtOH, Et_2O , C_6H_6 . Conc. HCl at 180° \rightarrow *trans*-form.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 133°/10 mm. D_4^{20} 1.054. n_D^{20} 1.453.

Anhydride: $C_8H_{10}O_3$. MW, 154. M.p. 32°. B.p. 145°/18 mm.

Trans:

dl.

Leaflets from H_2O . M.p. 221°. Resolved by quinine into active components. Dist. \rightarrow anhydride of *cis*-form.

Mono-Me ester: $C_9H_{14}O_4$. MW, 186. Cryst. from C_6H_6 -pet. ether. M.p. 96°.

Di-Me ester: $C_{10}H_{16}O_4$. MW, 200. Cryst. from C_6H_6 -pet. ether. M.p. 33°.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 135°/11 mm. D_4^{20} 1.040. n_D^{20} 1.450.

Anhydride: $C_8H_{10}O_3$. MW, 154. Needles from Et_2O . M.p. 140°.

Monoamide: $C_8H_{13}O_3N$. MW, 171. M.p. 196°.

d.

Cryst. powder from H_2O . M.p. 179–83°. $[\alpha]_D + 18.2^\circ$. More sol. than the *dl.* acid.

Mono-Me ester: m.p. 39°. $[\alpha]_D + 26.5^\circ$.

Di-Me ester: oil. $[\alpha]_D + 28.7^\circ$.

l.

Cryst. powder from H_2O . M.p. 179–83°. $[\alpha]_D - 18.5^\circ$.

Mono-Me ester: m.p. 39°. $[\alpha]_D - 24.8^\circ$.

Di-Me ester: oil. $[\alpha]_D - 29.6^\circ$.

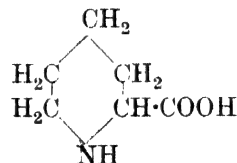
Baeyer, *Ann.*, 1890, **258**, 213.

Werner, Conrad, *Ber.*, 1899, **32**, 3053.

Auwers, Ottens, *Ber.*, 1924, **57**, 437.

Stoermer, Steinbeck, *Ber.*, 1932, **65**, 413.

Hexahdropicolinic Acid (*Piperidine-2-carboxylic acid, pipecolic acid*)



$C_6H_{11}O_2N$ MW, 129

d.

Plates from EtOH. M.p. 270°. Sol. H_2O , EtOH.

Tartrate: cryst. M.p. 187°.

l.

Plates. M.p. 270°. Sol. H_2O , EtOH.Aq. Spar. Sol. EtOH, Me_2CO , $CHCl_3$. Insol. Et_2O . Sublimes. Reacts neutral.

B,HCl: m.p. 256–8° decomp.

Tartrate: m.p. 187°.

dl.

Plates from H_2O . M.p. 264°. Sol. H_2O , EtOH.

Me ester: $C_7H_{13}O_2N$. MW, 143. Needles. M.p. 191°. Sol. H_2O . Spar. sol. EtOH.

Et ester: $C_8H_{15}O_2N$. MW, 157. Oil. B.p. 216–17°, 107°/20 mm.

N-Acetyl: m.p. 219° decomp.

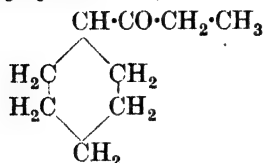
N-Me deriv.: methylpiperidine-2-carboxylic acid. $C_7H_{13}O_2N$. MW, 143. Oil. *B,HAuCl_4*: prisms from EtOH. M.p. 227–8° decomp.

Ladenburg, *Ber.*, 1891, **24**, 640.

Willstätter, *Ber.*, 1896, **29**, 390.

Hess, Leibrandt, *Ber.*, 1917, **50**, 385.

Hexahydropropiophenone (*Ethyl cyclohexyl ketone, propionylcyclohexane*)



$\text{C}_9\text{H}_{18}\text{O}$ MW, 140
Oil. B.p. 196° , $88-9^\circ/19$ mm. D_4^{20} 0.9105.
 n_D^{20} 1.4530.

Oxime: plates. M.p. $70-2^\circ$ ($72-3^\circ$).

Semicarbazone: plates from EtOH. M.p. $150-2^\circ$ ($144-50^\circ$).

Meerwein, *Ann.*, 1919, **419**, 167.

Hell, Schaal, *Ber.*, 1909, **42**, 2232.

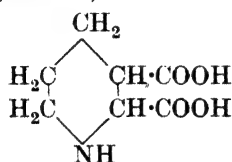
Hexahydropyrazine.

See Piperazine.

Hexahydropyridine.

See Piperidine.

Hexahydroquinolinic Acid (*Piperidine-2:3-dicarboxylic acid*)



$\text{C}_7\text{H}_{11}\text{O}_4\text{N}$ MW, 173

Cis:

M.p. 227° . Spar. sol. H_2O .

B.HCl: m.p. 239° . Very sol. H_2O .

Di-Et ester: $\text{C}_{11}\text{H}_{19}\text{O}_4\text{N}$. MW, 229. Oil.

B.HCl: m.p. $204-5^\circ$ decomp.

B.HAuCl₄: m.p. 195° decomp. Spar. sol. H_2O .

N-Nitroso: m.p. $138-9^\circ$ decomp. Very sol. H_2O .

Trans:

M.p. 253° decomp. Spar. sol. H_2O .

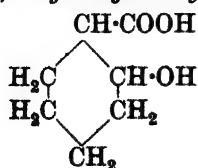
B.HCl: m.p. 221° decomp. Very sol. H_2O .

Di-Me ester: $\text{C}_9\text{H}_{15}\text{O}_4\text{N}$. MW, 201. *B.HCl*: m.p. $166-70^\circ$ decomp.

N-Nitroso: m.p. 154° decomp.

Besthorn, *Ber.*, 1896, **29**, 2662.

Hexahydrosalicylic Acid (*Cyclohexanol-2-carboxylic acid, 2-hydroxyhexahydrobenzoic acid*)



$\text{C}_7\text{H}_{12}\text{O}_3$

MW, 144 $\text{C}_7\text{H}_{14}\text{O}_2$

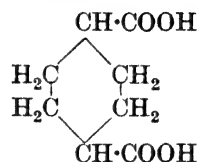
Needles from AcOEt. M.p. 111° . Sol. H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 .

Et ester: $\text{C}_9\text{H}_{16}\text{O}_3$. MW, 172. B.p. $120-1^\circ/30$ mm., $100-3^\circ/10$ mm.

Houben, Pfau, *Ber.*, 1916, **49**, 2295.

Einhorn, Meyenburg, *Ber.*, 1894, **27**, 2472.

Hexahydroterephthalic Acid (*Cyclohexane-1:4-dicarboxylic acid*)



$\text{C}_8\text{H}_{12}\text{O}_4$

MW, 172

Cis:

Leaflets from H_2O . M.p. $168-9^\circ$. Sol. EtOH, Et_2O , CHCl_3 , hot H_2O . Heat of comb. C_p 928.6 Cal., C_v 928.0 Cal. $k = 3 \times 10^{-6}$ at 100° . Conc. HCl at $180^\circ \rightarrow$ *trans*-form.

Di-Me ester: $\text{C}_{10}\text{H}_{16}\text{O}_4$. MW, 200. M.p. $3-5^\circ$. B.p. $132.5^\circ/10$ mm. D_4^{20} 1.1112.

Di-Et ester: $\text{C}_{12}\text{H}_{20}\text{O}_4$. MW, 228. B.p. $151^\circ/13$ mm. D_4^{20} 1.015. n_D^{20} 1.436.

Trans:

Prisms from H_2O . M.p. 300° . Sol. EtOH, Me_2CO . Spar. sol. Et_2O , hot H_2O . Insol. CHCl_3 . Heat of comb. C_p 929.5 Cal., C_v 928.9 Cal. $k = 2.5 \times 10^{-6}$ at 100° .

Mono-Me ester: $\text{C}_9\text{H}_{14}\text{O}_4$. MW, 186. Needles from pet. ether. M.p. 125° .

Di-Me ester: needles from Et_2O . M.p. 71° . Heat of comb. C_p 1273.9 Cal., C_v 1272.7 Cal.

Di-Et ester: D_4^{20} 1.011. n_D^{20} 1.434.

Willstätter, Jacquet, *Ber.*, 1918, **51**, 776.

Zelinsky, Glinka, *Ber.*, 1911, **44**, 2305.

Stoermer, Ladewig, *Ber.*, 1914, **47**, 1804.

Hexahydrothiophenol.

See Mercaptocyclohexane.

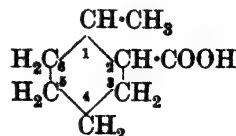
Hexahydrothymol.

See Menthol.

Hexahydrotoluene.

See Methylcyclohexane.

Hexahydro-*o*-toluic Acid (*1-Methylcyclohexane-2-carboxylic acid, 2-methylhexahydrobenzoic acid*)



MW, 142

"*Cis*":

B.p. 236–7°, 122–3°/10 mm. D_4^{20} 1.009. n_D^{20} 1.458. $k = 1.64 \times 10^{-5}$. Conc. HCl \longrightarrow "*trans*"-form.

Amide: $C_8H_{15}ON$. MW, 141. Needles from MeOH.Aq. M.p. 151–3°.

Nitrile: $C_8H_{13}N$. MW, 123. B.p. 79–81°/16 mm.

Anilide: needles from pet. ether. M.p. 66–8°.

"*Trans*":

Needles from C_6H_6 . M.p. 52°. B.p. 241–2°, 125°/12.5 mm. Sol. EtOH, Et₂O, CHCl₃, pet. ether. Spar. sol. H₂O, C_6H_6 . $k = 2.05 \times 10^{-5}$.

Me ester: $C_9H_{16}O_2$. MW, 156. B.p. 190°. D_4^{20} 0.9769.

Et ester: $C_{10}H_{18}O_2$. MW, 170. B.p. 203–4°/753 mm.

Chloride: $C_8H_{13}OCl$. MW, 160.5. B.p. 75–6°/15 mm. D_4^{20} 1.054. n_D^{20} 1.4653.

Amide: needles from H₂O. M.p. 180–1°.

Anilide: plates from C_6H_6 -pet. ether. M.p. 148°.

Zelinsky, *Ber.*, 1908, **41**, 2679.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1071.

Goodwin, Perkin, *J. Chem. Soc.*, 1895, **67**, 126.

Markownikow, Sernow, *J. Russ. Phys.-Chem. Soc.*, 1893, **25**, 632.

Hexahydro-*m*-toluic Acid (1-Methylcyclohexane-3-carboxylic acid, 3-methylhexahydrobenzoic acid).

l-.

B.p. 245°. D_4^{20} 1.007.

Me ester: $C_9H_{16}O_2$. MW, 156. B.p. 196–7°. D_4^{20} 0.9584.

Et ester: $C_{10}H_{18}O_2$. MW, 170. B.p. 208–10°.

Amide: $C_8H_{15}ON$. MW, 141. Leaflets from H₂O. M.p. 155–6°.

Nitrile: $C_8H_{13}N$. MW, 123. B.p. 86–7°/16 mm. D_4^{25} 0.887. n_D^{25} 1.449.

d-.

B.p. 132–4°/15 mm. D_4^{20} 0.9984. n_D^{20} 1.457. $k = 1.28 \times 10^{-5}$. $[\alpha]_D^{20} + 1.25^\circ$.

Chloride: $C_8H_{13}OCl$. MW, 160.5. B.p. 80–1°/15 mm.

Amide: $C_8H_{15}ON$. MW, 141. Leaflets from MeOH.Aq. M.p. 155–6°.

Gutt, *Ber.*, 1907, **40**, 2062.

Zelinsky, Gutt, *Ber.*, 1908, **41**, 2076.

Perkin, Tattersall, *J. Chem. Soc.*, 1905, **87**, 1091.

Markownikow, Hagemann, *J. Russ. Phys.-Chem. Soc.*, 1893, **25**, 638.

Hexahydro-*p*-toluic Acid (1-Methylcyclohexane-4-carboxylic acid, 4-methylhexahydrobenzoic acid).

Exists in two forms.

(i) *Solid*. Leaflets from H₂O. M.p. 112–13°. B.p. 245°, 135°/16 mm. Sol. EtOH, Et₂O, CHCl₃, pet. ether. Spar. sol. H₂O. $k = 1.11 \times 10^{-5}$.

Me ester: $C_9H_{16}O_2$. MW, 156. B.p. 192–4°. D_4^{20} 0.9532.

Et ester: $C_{10}H_{18}O_2$. MW, 170. B.p. 207–8°.

Amide: $C_8H_{15}ON$. MW, 141. Plates from H₂O. M.p. 221°.

Nitrile: $C_8H_{13}N$. MW, 123. B.p. 85–7°/18 mm. D_4^{25} 0.898. n_D^{25} 1.448.

(ii) *Liquid*. B.p. 140°/20 mm.

Amide: needles from H₂O. M.p. 176–8°.

Einhorn, Willstätter, *Ann.*, 1894, **280**, 157.

Willstätter, Jaquet, *Ber.*, 1918, **51**, 777.

Chou, Perkin, *J. Chem. Soc.*, 1911, **99**, 536.

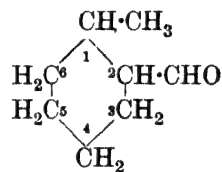
Wallach, Ritter, *Ann.*, 1911, **381**, 92.

Markownikow, Sserebrajakow, *J. Russ.*

Phys.-Chem. Soc., 1893, **25**, 646.

See also first reference above.

Hexahydro-*o*-toluic Aldehyde (1-Methyl-2-aldehydocyclohexane, 2-methylhexahydrobenzaldehyde)



$C_8H_{14}O$

MW, 126

Liq. with camphoraceous odour. B.p. 61–2°/15 mm.

Semicarbazone: m.p. 137–8°.

Darzens, Lefébure, *Compt. rend.*, 1906, **142**, 715.

Wallach, Beschke, *Ann.*, 1906, **347**, 339.

Hexahydro-*m*-toluic Aldehyde (1-Methyl-3-aldehydocyclohexane, 3-methylhexahydrobenzaldehyde).

B.p. 176–8°, 96–7°/50 mm. D_4^{20} 0.9091.

Semicarbazone: needles from EtOH. M.p. 159°.

Wallach, *Ann.*, 1906, **347**, 343.

Hexahydro-*p*-toluic Aldehyde (1-Methyl-4-aldehydocyclohexane, 4-methylhexahydrobenzaldehyde).

B.p. 180°, 64–5°/15 mm.

Hexahydrotoluidine

Semicarbazone: cryst. from H_2O . M.p. 154–6°.

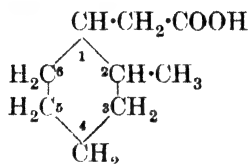
Darzens, Lefébure, *Compt. rend.*, 1906, 142, 715.

Harding, Haworth, Perkin, *J. Chem. Soc.*, 1908, 93, 1954.

Hexahydrotoluidine.

See Methylcyclohexylamine.

Hexahydro-*o*-tolylacetic Acid (2-Methylcyclohexylacetic acid)



$C_9H_{16}O_2$ MW, 156

Liq. with odour resembling butyric acid. B.p. 145–7°/13 mm.

Amide: $C_9H_{17}ON$. MW, 155. M.p. 160–1°.

v. Braun, Münch, *Ann.*, 1928, 465, 66.

Wallach, *Ann.*, 1912, 394, 384.

Hexahydro-*m*-tolylacetic Acid (3-Methylcyclohexylacetic acid).

Active form:

B.p. 148°/18 mm. D_4^{20} 0.9847. n_D^{20} 1.495. $[\alpha]_D - 9^\circ 26'$.

Et ester: $C_{11}H_{20}O_2$. MW, 184. B.p. 107–10°/18 mm. D_4^{15} 0.9322. n_D^{15} 1.4442. $[\alpha]_D - 7^\circ 25'$.

Inactive form:

B.p. 148°/18 mm. D_4^{15} 0.9911. n_D^{15} 1.4607.

Et ester: b.p. 107–10°/18 mm. D_4^{14} 0.9338. n_D^{14} 1.4434.

Chloride: $C_9H_{15}OCl$. MW, 174.5. B.p. 95–6°/11 mm.

v. Braun, Teuffert, *Ber.*, 1925, 58, 2210.

Hexahydro-*p*-tolylacetic Acid (4-Methylcyclohexylacetic acid).

Plates from aq. formic acid. M.p. 73–4°.

Sol. most org. solvents.

Amide: cryst. M.p. 161–2°.

Chloride: b.p. 75°/7 mm.

Perkin, Pope, *J. Chem. Soc.*, 1908, 93, 1080.

Wallach, Evans, *Chem. Zentr.*, 1907, II, 54.

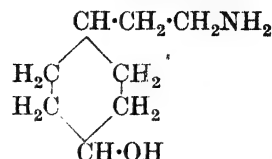
Hexahydrotolylcarbinol.

See Methylcyclohexylcarbinol.

175

1 : 2 : 4 : 5 : 6 : 8-Hexahydroxyanthraquinone

Hexahydrotyramine (4-[β -Aminoethyl]cyclohexanol, 4-hydroxyhexahydrophenylethylamine, 4-hydroxycyclohexylethylamine)



$C_8H_{17}ON$ MW, 143

Needles. M.p. 44–52°. Sol. H_2O , EtOH, AcOEt. Spar. sol. Et₂O. Insol. pet. ether.

B.HCl: m.p. 160°.

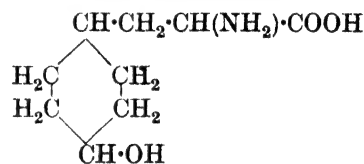
O: *N*-Di-*p*-nitrobenzoyl: m.p. 181–2°.

B_2, H_2PtCl_6 : m.p. 204–5°.

Oxalate: m.p. 211°.

Waser, Fauser, *Helv. Chim. Acta*, 1927, 10, 262.

Hexahydrotyrosine (4-Hydroxyhexahydrophenyl- α -alanine, 4-hydroxycyclohexyl- α -alanine, 1-amino-2-[4-hydroxycyclohexyl]-propionic acid)



$C_9H_{17}O_3N$ MW, 187

l.

Needles from H_2O . M.p. 285°. $[\alpha]_{55.3}^{20} + 10.58^\circ$. Does not give Millon test.

Et ester: $C_{11}H_{21}O_3N$. MW, 215. M.p. 99–100°. B.p. 185°/11 mm. $[\alpha]_{55.3}^{20} - 11.76^\circ$.

Hydrochloride: m.p. 201°.

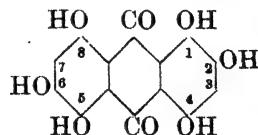
B.HCl: m.p. 238°.

N-p-Nitrobenzoyl: m.p. 225–6°.

Waser, Brauchli, *Helv. Chim. Acta*, 1924, 7, 747.

1 : 2 : 3 : 5 : 6 : 7-Hexahydroxyanthraquinone.

See Rufigallic Acid.

1 : 2 : 4 : 5 : 6 : 8-Hexahydroxyanthraquinone

$C_{14}H_8O_8$ MW, 304

Dark green cryst. from AcOH. Sol. dil. alkalis to bluish-red sols.; conc. $H_2SO_4 \rightarrow$ bluish-violet sol.

Bayer, D.R.Ps., 65,453, 81,959, 86,969.

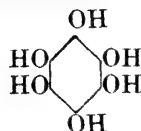
1 : 2 : 4 : 5 : 7 : 8-Hexahydroxyanthraquinone 176

1 : 2 : 4 : 5 : 7 : 8 - Hexahydroxyanthraquinone (*Alizarinhexacyanin*).

Cryst. from EtOH. Violet-blue sol. in Na_2CO_3 . Aq.; greenish-blue in NaOH . Aq.; blue in conc. H_2SO_4 . Ox. \rightarrow 2 : 5 : 7 : 8-tetrahydroxyanthradiquinone-1 : 4 : 9 : 10.

Bayer, D.R.P.s., 66,153, 68,114, 69,842.

Hexahydroxybenzene (*Hexaphenol*)



$\text{C}_6\text{H}_6\text{O}_6$

MW, 174

Needles from H_2O . Turns dark grey at 200° . Does not melt. Spar. sol. H_2O , EtOH, Et_2O , C_6H_6 . Sols. turn reddish-violet in air. Reduces AgNO_3 . Ox. \rightarrow tetrahydroxy-*p*-benzoquinone. Zn dist. \rightarrow benzene + diphenyl. $\text{FeCl}_3 \rightarrow$ violet col.

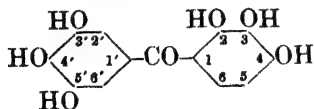
Hexa-acetyl: prisms from AcOH. M.p. 203° . Insol. EtOH, Et_2O , C_6H_6 .

Wieland, Wishart, *Ber.*, 1914, **47**, 2084.

Nietzki, Benckiser, *Ber.*, 1885, **18**, 505.

Jackson, Grindley, *Am. Chem. J.*, 1895, **17**, 648.

2 : 3 : 4 : 3' : 4' : 5' - Hexahydroxybenzophenone (4-Galloylpyrogallol)



$\text{C}_{13}\text{H}_{10}\text{O}_7$

MW, 278

Yellowish needles from H_2O . M.p. $272-3^\circ$.

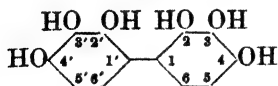
Hexa-acetyl: m.p. 132° .

Bleuler, Perkin, *J. Chem. Soc.*, 1916, **109**, 541.

Hexahydroxycyclohexane.

See Inositol.

2 : 3 : 4 : 2' : 3' : 4' - Hexahydroxydiphenyl



$\text{C}_{12}\text{H}_{10}\text{O}_6$

MW, 250

Needles from H_2O . Darkens at 250° . M.p. above 250° . Sol. hot H_2O , hot EtOH. Spar. sol. cold H_2O , EtOH, Et_2O , CHCl_3 , CS_2 , C_6H_6 . Zn + $\text{H}_2 \rightarrow$ diphenyl.

Hexa-Me ether: $\text{C}_{18}\text{H}_{22}\text{O}_6$. MW, 334. M.p. 123° .

Barth, Goldschmidt, *Ber.*, 1879, **12**, 1244.

8 : 9 : 11 : 12 : 14 : 15-Hexahydroxystearic Acid

2 : 4 : 5 : 2' : 4' : 5' - Hexahydroxydiphenyl.

Free phenol not isolated.

Hexa-Me ether: needles from EtOH or AcOH. M.p. 180° . Sol. CHCl_3 . Spar. sol. EtOH, AcOH, C_6H_6 . Insol. H_2O . HI \rightarrow 2 : 3 : 6 : 7-tetrahydroxydiphenylene oxide.

Fabinyi, Széki, *Ber.*, 1910, **43**, 2682.

3 : 4 : 5 : 3' : 4' : 5' - Hexahydroxydiphenyl.

Cryst. from H_2O . M.p. above 300° . Sol. EtOH. Mod. sol. H_2O . Spar. sol. Et_2O , C_6H_6 . Zn + $\text{H}_2 \rightarrow$ diphenyl.

Hexa-Me ether: needles from EtOH. M.p. 126° . Sol. EtOH, AcOH.

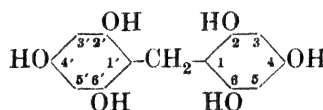
3 : 5 : 3' : 5' - *Tetra-Me ether*: $\text{C}_{16}\text{H}_{18}\text{O}_6$. MW, 306. M.p. about 190° . Spar. sol. H_2O , Et_2O .

Hexa-acetyl: needles from AcOH. M.p. 236° .

Liebermann, *Ann.*, 1873, **169**, 241.

Liebermann, Herrmuth, *Ber.*, 1912, **45**, 1221.

2 : 4 : 6 : 2' : 4' : 6' - Hexahydroxydiphenylmethane



$\text{C}_{13}\text{H}_{12}\text{O}_6$

MW, 264

M.p. 225° decomp. Sol. EtOH, Et_2O , AcOH. Prac. insol. H_2O , C_6H_6 .

Boehm, *Ann.*, 1903, **329**, 269.

3 : 4 : 5 : 3' : 4' : 5' - Hexahydroxydiphenylmethane.

M.p. 241° decomp. Sol. EtOH. Insol. H_2O .

Kahl, *Ber.*, 1898, **31**, 144.

Caro, *Ber.*, 1892, **25**, 947.

3 : 5 : 6 : 7 : 3' : 4' - Hexahydroxyflavone.

See Quercetagenin.

3 : 5 : 7 : 8 : 3' : 4' - Hexahydroxyflavone.

See Gossypetin.

3 : 5 : 7 : 3' : 4' : 5' - Hexahydroxyflavone.

See Myricetin.

Hexahydroxyisoflavone.

See Irogenol.

Hexahydro-xylene.

See Dimethylcyclohexane.

Hexahydro-xyleneol.

See Dimethylcyclohexanol.

8 : 9 : 11 : 12 : 14 : 15-Hexahydroxystearic Acid



$\text{C}_{18}\text{H}_{34}\text{O}_8$

MW, 380

Exists in two forms sometimes termed linusinic acid and isolinusinic acids. Both on ox. \rightarrow

azelaic acid and propionic acid. NaOH.Aq. + $\text{KClO}_3 \rightarrow$ acetic, propionic and azelaic acids.

Linusinic acid (linusic acid): needles from H_2O . M.p. 203° . Sol. hot H_2O , EtOH.

Isolinusinic acid (isolinusic acid): needles. M.p. 173° . Sol. hot H_2O . Spar. sol. EtOH, cold H_2O . Insol. Et_2O , CHCl_3 , CS_2 , C_6H_6 .

Bauer, *Chem. Umschau.*, 1924, **31**, 33.

Hazura, Friedrich, *Monatsh.*, 1888, **9**, 181.

Rollet, *Z. physiol. Chem.*, 1909, **62**, 430.

Goldsohel, *Chem. Zentr.*, 1910, **1**, 1231.

Hexaiodoacetone (*Hexaiodopropanone, periodoacetone*)



C_3OI_6 MW, 810

Bright yellow cryst. powder. M.p. 78° . $\text{H}_2\text{O} \rightarrow$ penta- and tetra-iodoacetones. Decomp. in most solvents. NaOH.Aq. \rightarrow iodoform.

Lederer, D.R.P., 95,440.

Hexaiodobenzene



C_6I_6 MW, 834

Reddish-brown needles from boiling PhNO_2 . M.p. $340-50^\circ$. Insol. usual solvents.

Rupp, *Ber.*, 1896, **29**, 1631.

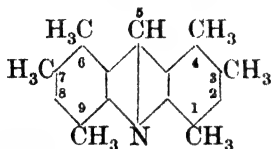
Hexalin.

See Cyclohexanol.

Hexamethylacetone.

See Pivalone.

1 : 3 : 4 : 6 : 7 : 9-Hexamethylacridine



$\text{C}_{19}\text{H}_{21}\text{N}$ MW, 263

Yellow needles from EtOH, Me_2CO or ligroin. M.p. $221-2^\circ$. Sol. CHCl_3 , ligroin. Spar. sol. EtOH, Et_2O . Insol. H_2O . Sublimes. Sols. show green fluorescence. Conc. $\text{HNO}_3 \rightarrow$ di-nitro deriv.

B, HCl: red cryst. Decomp. on heating.

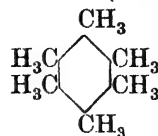
B, HNO_3: m.p. $163-4^\circ$ decomp.

Picrate: m.p. $200-2^\circ$.

Senier, Compton, *J. Chem. Soc.*, 1907, **91**, 1934.

Dict. of Org. Comp.—II.

Hexamethylbenzene (*Mellithene, mellitene*)



$\text{C}_{12}\text{H}_{18}$ MW, 162

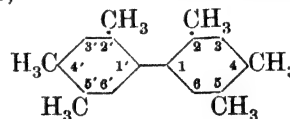
Needles from EtOH. M.p. 164° . B.p. 264° . Very sol. hot EtOH, C_6H_6 . Sol. EtOH. Heat of comb. C_v 1709.6 Cal. Crit. temp. 478° . Ox. \rightarrow mellitic acid. HI \rightarrow mesitylene + methane.

Picrate: m.p. 170° .

Smith, *Organic Syntheses*, 1930, **X**, 32.

Reckleben, Scheiber, *Ber.*, 1913, **46**, 2363.

2 : 4 : 5 : 2' : 4' : 5' - Hexamethyldiphenyl (*Di-ψ-cumyl*)



$\text{C}_{18}\text{H}_{22}$ MW, 238

Plates from EtOH. M.p. 52° . B.p. $320^\circ/738$ mm. Sol. C_6H_6 . Spar. sol. EtOH.

Ullmann, Meyer, *Ann.*, 1904, **332**, 47.

2 : 4 : 6 : 2' : 4' : 6' - Hexamethyldiphenyl (*Dimesityl*).

Cryst. from EtOH. M.p. 100.5° . B.p. $296^\circ/735$ mm. Sol. Et_2O , C_6H_6 . Spar. sol. EtOH. $\text{HNO}_3 \rightarrow$ tetranitro deriv. Br \rightarrow 3 : 3'-di-bromo deriv.

Ullmann, Meyer, *Ann.*, 1904, **332**, 48.

Moyer, Adams, *J. Am. Chem. Soc.*, 1929, **51**, 632.

3 : 4 : 5 : 3' : 4' : 5' - Hexamethyldiphenyl (*Dihemimellityl*).

Cryst. from EtOH.Aq. M.p. $132-3^\circ$.

Liebermann, Kardos, *Ber.*, 1913, **46**, 210.

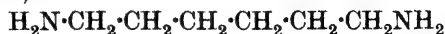
Hexamethyldipyridyl.

See Dicollidyl.

Hexamethylene.

See Cyclohexane.

Hexamethylenediamine (1 : 6-Diamino-hexane)



$\text{C}_6\text{H}_{16}\text{N}_2$ MW, 116

Leaflets. M.p. 42° ($39-40^\circ$). Sublimes in long needles. B.p. $204-5^\circ$, $100^\circ/20$ mm. Sol. H_2O , EtOH, C_6H_6 .

N : N'-Dibenzoyl: m.p. 155° .

Di-Et urethane: m.p. 84° .

B, 2HCl: m.p. 248° .

B, 2(COOH) $_2$: m.p. 168° .

Di-benzenesulphonyl : m.p. 154°.

B, H₂PtCl₆ : m.p. 200° decomp.

Picrate : m.p. 220°.

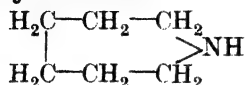
Curtius, Clemm, *J. prakt. Chem.*, 1900, **62**, 194; *Ber.*, 1896, **29**, 1167.

v. Braun, Müller, *Ber.*, 1905, **38**, 2204.

Hexamethylene Glycol.

See Hexandiol-1 : 6.

Hexamethyleneimine



C₆H₁₃N

MW, 99

B.p. 138° (126-7°, 140°). Part. misc. with H₂O. *D*₄²⁰ 0.8643. *n*_D²⁰ 1.457.

N-Acetyl : b.p. 239-41°.

N-Benzoyl : m.p. 36°.

B, HCl : m.p. 222°.

B, HAuCl₄ : m.p. 206°.

B₂, H₂PtCl₆ : m.p. 197° (203°).

Picrate : m.p. 146°.

Müller, Sauerwald, *Monatsh.*, 1927, **48**, 727.

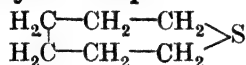
v. Braun, Goll, *Ber.*, 1927, **60**, 1533.

Schmidt, *Ber.*, 1922, **55**, 1584.

Hexamethylene iodide.

See 1 : 6-Di-iodo-*n*-hexane.

Hexamethylene sulphide



C₆H₁₂S

MW, 116

Colourless mobile liq. B.p. 169-71°/747 mm. *D*₄¹⁸ 0.9743. *n*_D¹⁸ 1.5044. KMnO₄ → sulphone, m.p. 71°. Forms add. comp. with 1 mol. HgCl₂, m.p. 149°.

Methiodide : colourless prisms. M.p. 137.5-138.5°.

Grischkevitch-Trochimovskii, *J. Russ. Phys.-Chem. Soc.*, 1916, **48**, 944.

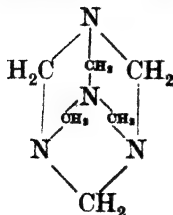
v. Braun, *Ber.*, 1910, **43**, 3224.

Hexamethylene sulphone.

See under Hexamethylene sulphide.

Hexamethylenetetramine (Aminoform,

Formin, Hexa, Hexamine, Urotropine)



C₆H₁₂N₄

MW, 140

Rhombohedral cryst. from EtOH. Sol. H₂O, EtOH, CHCl₃. Less sol. warm H₂O than cold. Insol. Et₂O. Volatilises on heating with part. decomp. Sublimes in vacuo. Heat of comb. C₆ 1005.85 Cal. Dil. acids → formaldehyde + NH₃. HNO₂ + HCl → trimethylenetrinitrosamine (m.p. 106°) and dinitrosopentamethylene-tetramine. HNO₂ + AcOH → formaldehyde + methylamine + NH₃. 96% HNO₃ at 0° → trimethylenetrinitroamine (hexogen *q.v.*). H₂S → thioformaldehyde. Br → tetrabromide, which loses Br₂ to give a dibromide m.p. 196-200° decomp. Zn + HCl → mainly NH₃ + trimethylamine. Stable to hot alkalis. Forms compounds with acids and metallic salts. Pptd. quantitatively by HgCl₂. Used as urinary antiseptic, rubber vulcanisation accelerator, and for microscopic test for Au and Hg. Citrate (Helmitol, Formamol), camphorate (Amphotropin) and other salts are used in medicine.

B, H₂O : m.p. 15° (13.5°) decomp.

B, H₂SO₄, H₂O : m.p. 108°.

B, HI : m.p. 170-1°.

Methiodide : needles from EtOH. M.p. 190° (204°) decomp. Sol. H₂O, EtOH. Insol. Et₂O, CHCl₃.

Picrate : m.p. 179° decomp.

Butlerow, *Ann.*, 1860, **115**, 322.

Wohl, *Ber.*, 1886, **19**, 1842.

Höland, *Ann.*, 1887, **240**, 225.

Grassi-Cristaldi, Motta, *Gazz. chim. ital.*, 1899, **29**, 43.

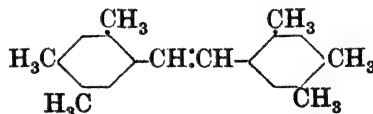
Chemnitius, *Chem.-Ztg.*, 1928, **52**, 735.

Landt, Adams, U.S.P., 1,774,929, (*Chem. Abstracts*, 1930, **24**, 5046).

Hexamethylethane.

See 2 : 2 : 3 : 3-Tetramethylbutane.

2 : 4 : 5 : 2' : 4' : 5' - Hexamethylstilbene (Di-*ψ*-cumylethylene)



C₂₀H₂₄

MW, 264

Cryst. from EtOH. M.p. 161°. Mod. sol. CHCl₃, CS₂, C₆H₆. Prac. insol. ligroin. Shows violet fluorescence.

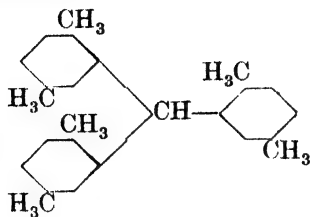
Picrate : C₂₀H₂₄, 2C₆H₃O₇N₃, C₆H₆. Cryst. from C₆H₆. M.p. 123°.

C₂₀H₂₄, C₆H₃(NO₂)₃ 1 : 3 : 5 : prisms from AcOH. M.p. 145-7°.

Elbs, *J. prakt. Chem.*, 1893, **47**, 51.

2 : 5 : 2' : 5' : 2'' : 5''-Hexamethyltri-phenylmethane

2 : 5 : 2' : 5' : 2'' : 5''-Hexamethyltri-phenylmethane



$C_{25}H_{28}$ MW, 328

Cryst. from EtOH. M.p. 188°. Sol. Et₂O, C₆H₆. Mod. sol. EtOH.

Elbs, *J. prakt. Chem.*, 1887, **35**, 484.

Hexamine.

See Hexamethylenetetramine.

Hexanal.

See Caproic Aldehyde.

Hexandial-1 : 6.

See Adipic-dialdehyde.

Hexandiol-1 : 2 (1 : 2-Dihydroxyhexane, butyl-ethylene glycol, 1-hexene glycol)

$CH_3 \cdot [CH_2]_3 \cdot CH(OH) \cdot CH_2OH$
 $C_6H_{14}O_2$ MW, 118

d.

B.p. 110–13°/6 mm. $[\alpha]_D^{22} + 15.2^\circ$.

Di-1-naphthylcarbamate : m.p. 172–4°.

Brooks, Humphrey, *J. Am. Chem. Soc.*, 1918, **40**, 834.

Levene, Haller, *J. Biol. Chem.*, 1928, **79**, 483.

Hexandiol-1 : 4 (1 : 4-Dihydroxyhexane, 1-ethyltetramethylene glycol)

$CH_3 \cdot CH_2 \cdot CH(OH) \cdot [CH_2]_2 \cdot CH_2OH$
 $C_6H_{14}O_2$ MW, 118

Not solid at –20°. B.p. 134–5°/18.5 mm. Sol. H₂O, EtOH, Et₂O. Hot dil. H₂SO₄ → 2-ethyltetrahydrofuran.

Wohlgemuth, *Compt. rend.*, 1914, **159**, 80.

Hexandiol-1 : 5 (1 : 5-Dihydroxyhexane, 1-methylpentamethylene glycol)

$CH_3 \cdot CH(OH) \cdot [CH_2]_3 \cdot CH_2OH$
 $C_6H_{14}O_2$ MW, 118

B.p. 234–5°/710 mm., 140–1°/17 mm. D° 0.9809. 60% H₂SO₄ → 2-methylpentamethylene oxide. HBr → 1 : 5-dibromohexane.

Lipp, *Ber.*, 1885, **18**, 3282.

Perkin, *J. Chem. Soc.*, 1887, **51**, 722.

179

Hexandiol-2 : 5

Hexandiol-1 : 6 (1 : 6-Dihydroxyhexane, hexamethylene glycol)

$HO \cdot CH_2 \cdot [CH_2]_4 \cdot CH_2OH$
 $C_6H_{14}O_2$ MW, 118

Needles from H₂O. M.p. 42° (40°). B.p. 250°, 152°/17 mm., 151°/12 mm. Sol. H₂O, EtOH. Conc. H₂SO₄ → hexamethylene oxide.

Mono-Me ether : C₇H₁₆O₂. MW, 132. B.p. 123°/31 mm.

Di-Me ether : 1 : 6-dimethoxyhexane. C₈H₁₈O₂. MW, 146. B.p. 180°.

Di-Et ether : 1 : 6-diethoxyhexane. C₁₀H₂₂O₂. MW, 174. B.p. 208°.

Haworth, Perkin, *J. Chem. Soc.*, 1894, **65**, 598.

Hamonet, *Bull. soc. chim.*, 1905, **33**, 538.

Lespieau, *Ann. chim.*, 1912, **27**, 176.

Hexandiol-2 : 3 (2 : 3-Dihydroxyhexane, 1-methyl-2-propylethylene glycol, 2-hexene glycol)

$CH_3 \cdot [CH_2]_2 \cdot CH(OH) \cdot CH(OH) \cdot CH_3$
 $C_6H_{14}O_2$ MW, 118

B.p. 207° (204–6°). D° 0.9669. Sol. H₂O. CrO₃ → butyric acid, acetic acid and CO₂.

Hecht, Munier, *Ber.*, 1878, **11**, 1154.

Eltekow, *Journal of the Russian Chemical Society*, 1882, **1**, 355.

Hexandiol-2 : 4 (2 : 4-Dihydroxyhexane, 1-methyl-3-ethyltrimethylene glycol)

$CH_3 \cdot CH_2 \cdot CH(OH) \cdot CH_2 \cdot CH(OH) \cdot CH_3$
 $C_6H_{14}O_2$ MW, 118

B.p. 206° slight decomp., 210–11°/750 mm., 104–5–105–5°/9 mm. D₄²¹ 0.9516. n_D²¹ 1.4418. PBr₃ in Py at 140° → 2 : 4-dibromohexane.

Diacetyl : b.p. 211°/750 mm. part. decomp., 101–2°/13 mm.

Diphenylcarbamate : m.p. 144°.

Franke, Kohn, *Monatsh.*, 1906, **27**, 1111.

Lespieau, Wakeman, *Bull. soc. chim.*, 1932, **51**, 389.

Hexandiol-2 : 5 (2 : 5-Dihydroxyhexane, 1 : 4-dimethyltetramethylene glycol)

$CH_3 \cdot CH(OH) \cdot [CH_2]_2 \cdot CH(OH) \cdot CH_3$
 $C_6H_{14}O_2$ MW, 118

Exists in two forms.

(i) Solid. M.p. 43–4°.

(ii) Liquid. B.p. 212–15°, 216–18°/750 mm., 219–20°/745 mm., 120–2°/12 mm. Sol. H₂O, EtOH, Et₂O. D₄²⁰ 0.9610, D₄²⁴ 0.9605, D° 0.9638 (0.9759). n_D²⁰ 1.4475. Dil. H₂SO₄ → 2 : 5-dimethyltetrahydrofuran. CrO₃ →

acetic acid + CO₂. HBr → 2 : 5-dibromohexane.

Diacetyl : b.p. 230°.

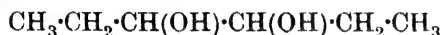
Wurtz, *Ann. chim.*, 1864, 3, 166.

Sorokin, *J. prakt. Chem.*, 1881, 23, 18.

Duden, Lemme, *Ber.*, 1902, 35, 1335.

Dupont, *Ann. chim.*, 1913, 30, 526.

Hexandiol-3 : 4 (3 : 4-*Dihydroxyhexane*, sym.-*diethylethylene glycol*, 3-*hexene glycol*)



C₆H₁₄O₂

MW, 118

Exists in three forms.

(i) M.p. above - 20°. B.p. 87-8°/15 mm.

(ii) M.p. 88°. B.p. 90-1°/15 mm.

(iii) *Meso form* : m.p. 88°. B.p. 91°/20 mm.

Sol. H₂O, EtOH, Et₂O, C₆H₆, etc. CrO₃ → propionic acid. Br water → dipropionyl.

Farmer, Laroia, Switz, Thorpe, *J. Chem. Soc.*, 1927, 2946.

Kuhn, Rebel, *Ber.*, 1927, 60, 1570.

Hexandione-2 : 3.

See Acetylbutyryl.

Hexandione-2 : 4.

See Propionylacetone.

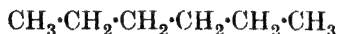
Hexandione-2 : 5.

See Acetonylacetone.

Hexandione-3 : 4.

See Dipropionyl.

n-Hexane (*Dipropyl*)



C₆H₁₄

MW, 86

Occurs in petroleum. F.p. - 93.5° (- 95.4°). B.p. 68-95°, 68.4-68.8°/744 mm. D₄⁰ 0.67703, D₂₀⁰ 0.6603 (0.65945), D₄²⁵ 0.65502. n_D²⁰ 1.37506, n_D²⁵ 1.37230. Heat of comb. C_p 991.2 Cal., C_v 989.2 (997.8) Cal. Cl → 1-, 2-, and 3-chlorohexanes. Br → 1-, 2-, and 3-bromohexanes. Br (+ Fe) → 1 : 2 : 3 : 4 : 5 : 6-hexabromohexane. Dil. HNO₃ → 2-nitrohexane.

Michael, *Am. Chem. J.*, 1901, 25, 421.

Failliebin, *Bull. soc. chim.*, 1924, 35, 160.

Corson, E.P., 279,095, (*Chem. Abstracts*, 1928, 22, 2755).

Shepard, Henne, Midgley, *J. Am. Chem. Soc.*, 1931, 53, 1948.

Hexane-1-carboxylic Acid.

See n-Heptylic Acid.

Hexane-2-carboxylic Acid.

See 1-Methylcaproic Acid.

Hexane-3-carboxylic Acid.

See 1-Ethyl-n-valeric Acid.

Hexane-1 : 1-dicarboxylic Acid.

See n-Amylmalonic Acid.

Hexane-1 : 3-dicarboxylic Acid.

See 1-Propylglutaric Acid.

Hexane-1 : 4-dicarboxylic Acid.

See 1-Ethyladipic Acid.

Hexane-1 : 5-dicarboxylic Acid.

See 1-Methylpimelic Acid.

Hexane-1 : 6-dicarboxylic Acid.

See Suberic Acid.

Hexane-2 : 2-dicarboxylic Acid.

See Methylbutylmalonic Acid.

Hexane-2 : 3-dicarboxylic Acid.

See 1-Methyl-2-propylsuccinic Acid.

Hexane-2 : 4-dicarboxylic Acid.

See 1-Methyl-3-ethylglutaric Acid.

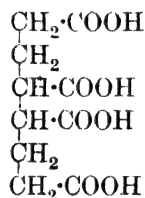
Hexane-3 : 3-dicarboxylic Acid.

See Ethylpropylmalonic Acid.

Hexane-3 : 4-dicarboxylic Acid.

1 : 2-Diethylsuccinic Acid, *q.v.*

Hexane-1 : 3 : 4 : 6-tetracarboxylic Acid



C₁₀H₁₄O₈

MW, 262

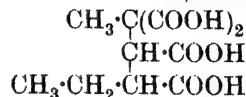
Prisms from Me₂CO-C₆H₆. M.p. 215° decomp. Sol. H₂O, EtOH, Et₂O, C₆H₆.

Di-Me ester : C₁₂H₁₈O₈. MW, 290. M.p. 133°.

Silberrad, *J. Chem. Soc.*, 1904, 85, 614.

Sell, Jackson, *J. Chem. Soc.*, 1899, 75, 515.

Hexane-2 : 2 : 3 : 4-tetracarboxylic Acid



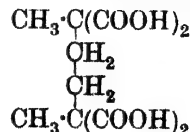
C₁₀H₁₄O₈

MW, 262

Cryst. from Me₂CO-ligroin. M.p. 170°.

Michael, Ross, *J. Am. Chem. Soc.*, 1931, 53, 1164.

Hexane-2 : 2 : 5 : 5-tetracarboxylic Acid



C₁₀H₁₄O₈

MW, 262

Needles from H₂O. M.p. 200° (rapid heat.), 170° (slow heat.), decomp. Sol. H₂O, EtOH,

Hexane-1 : 2 : 3-tricarboxylic Acid

181

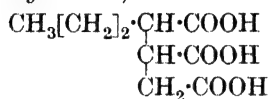
Et₂O. Insol. C₆H₆, ligroin. Heat → 1 : 4-dimethyladipic acid.

Tetra-Et ester: C₁₈H₃₀O₈. MW, 374. Cryst. from EtOH.Aq. or ligroin. M.p. 53·5°.

Kitzing, *Ber.*, 1894, **27**, 1578.

Lean, *J. Chem. Soc.*, 1894, **65**, 1004.

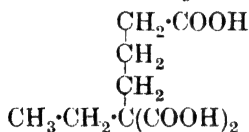
Noyes, Kyriakides, *J. Am. Chem. Soc.*, 1910, **32**, 1059.

Hexane-1 : 2 : 3-tricarboxylic Acid (1-Propyltricarballic acid)

C₉H₁₄O₆ MW, 218

Lamine + H₂O from H₂O. M.p. 151–2° (anhyd.). Sol. H₂O, EtOH, Et₂O. Insol. C₆H₆, ligroin. $k = 3\cdot1 \times 10^{-4}$ at 25°.

Auwers, Köbner, v. Meyenburg, *Ber.*, 1891, **24**, 2898.

Hexane-1 : 4 : 4-tricarboxylic Acid (1-Ethylbutane-1 : 1 : 4-tricarboxylic acid)

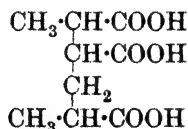
C₉H₁₄O₆ MW, 218

M.p. 155–8° decomp. (evolution of CO₂).

Tri-Et ester: C₁₅H₂₆O₆. MW, 302. B.p. 205–8°/35 mm., 180–3°/28 mm.

Lean, Lees, *J. Chem. Soc.*, 1897, **71**, 1065.

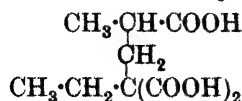
Mellor, *J. Chem. Soc.*, 1901, **79**, 131.

Hexane-2 : 3 : 5-tricarboxylic Acid (1 : 4-Dimethylbutane-1 : 2 : 4-tricarboxylic acid)

C₉H₁₄O₆ MW, 218

Cryst. from CHCl₃-ligroin. M.p. 107°. Sol. H₂O, EtOH, Et₂O. $k = 1\cdot61 \times 10^{-4}$ at 25°.

Henstock, Sprankling, *J. Chem. Soc.*, 1907, **91**, 357.

Hexane-2 : 4 : 4-tricarboxylic Acid

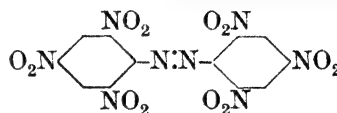
C₉H₁₄O₆ MW, 218

2 : 4 : 6 : 2' : 4' : 6'-Hexanitrodiphenylamine.

M.p. 166·5° decomp. Sol. H₂O, EtOH, Et₂O. Me₂CO, C₆H₆, AcOH. Prac. insol. CS₂, ligroin, $k = 9\cdot7 \times 10^{-3}$ at 25°. Heat → 1-methyl-3-ethylglutaric acid.

Tri-Et ester: C₁₅H₂₆O₆. MW, 302. B.p. 294·3°. D₄²⁰ 1·0435. n_D^{20} 1·4372.

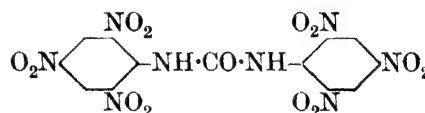
Bischoff, *Ber.*, 1891, **24**, 1053.

2 : 4 : 6 : 2' : 4' : 6'-Hexanitroazobenzene

C₁₂H₄O₁₂N₈ MW, 452

Red prisms from AcOH or PhNO₂. M.p. 215–16°. Spar. sol. EtOH, Et₂O, C₆H₆.

Grandmougin, Leemann, *Ber.*, 1906, **39**, 4385; *Ber.*, 1908, **41**, 1297.

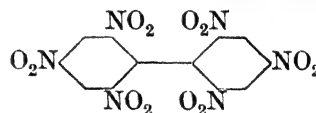
2 : 4 : 6 : 2' : 4' : 6'-Hexanitrocarbanilide (2 : 4 : 6 : 2' : 4' : 6'-Hexanitro-sym.-diphenylurea, N : N'-dipicrylurea)

C₁₃H₆O₁₃N₈ MW, 482

Prisms. M.p. 203° (206–9°). Sol. hot PhNO₂.

Reudler, *Rec. trav. chim.*, 1914, **33**, 59, 63.

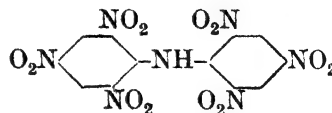
Perkin, *J. Chem. Soc.*, 1893, **63**, 1068.

2 : 4 : 6 : 2' : 4' : 6'-Hexanitrodiphenyl

C₁₂H₄O₁₂N₆ MW, 424

M.p. 238°. Spar. sol. C₆H₆. Insol. EtOH, Et₂O. Separates in brown cryst. + ½ C₆H₅·CH₃ from toluene.

Ullmann, Bielecki, *Ber.*, 1901, **34**, 2179.

2 : 4 : 6 : 2' : 4' : 6' - Hexanitrodiphenylamine (p-Dipicrylamine)

C₁₂H₆O₁₂N₇ MW, 439

Yellow prisms from AcOH. M.p. 242° decomp. Insol. H₂O, Et₂O, and most org. solvents. Reacts acid. Ammonium salt is dyestuff *Aurantia*, used in light filters and

2 : 4 : 5 : 2' : 4' : 6'-Hexanitrodiphenyl Ether

microscopic stains. Explosive, used in torpedoes. Very poisonous.

N-Acetyl: yellow cryst. M.p. 240° decomp.

N-Me: methyldipicrylamine. $C_{13}H_7O_{12}N_7$. MW, 453. Yellow cryst. from EtOH. M.p. 236-7°. Sol. AcOH, Me_2CO . Spar. sol. EtOH, Et_2O . Insol. H_2O . See ref.* below.

N-Et: ethyldipicrylamine. $C_{14}H_9O_{12}N_7$. MW, 467. Needles. M.p. 201-2°. Sol. AcOEt, Me_2CO . Spar. sol. EtOH, C_6H_6 , $CHCl_3$, ligroin. See ref.* below.

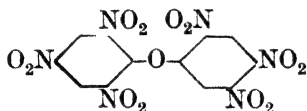
Gnehm, *Ber.*, 1874, 7, 1399.

Hoffman, Dame, *J. Am. Chem. Soc.*, 1919, 41, 1013.

Marshall, U.S.P., 1,326,947, (*Chem. Abstracts*, 1920, 14, 633).

* Mulder, *Rec. trav. chim.*, 1906, 25, 121-2. Vanino, *Präparativen Chemie*, II, 456.

2 : 4 : 5 : 2' : 4' : 6'-Hexanitrodiphenyl Ether



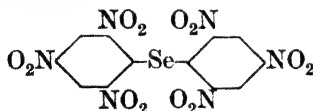
$C_{12}H_4O_{13}N_6$ MW, 440

Needles from AcOH. M.p. 269°. Sol. AcOH, $PhNO_2$. Spar. sol. EtOH, Et_2O . Insol. H_2O .

Westfälisch-Anhaltische Sprengstoffaktiengesellschaft, D.R.P., 281,053, (*Chem. Zentr.*, 1915, I, 74).

van Duin, van Lennep, *Rec. trav. chim.*, 1920, 39, 154.

2 : 4 : 6 : 2' : 4' : 6'-Hexanitrodiphenyl selenide (Dipicryl selenide)

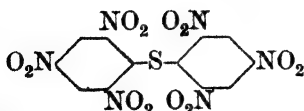


$C_{12}H_4O_{12}N_6Se$ MW, 503

M.p. above 240° decomp. Sol. AcOH, AcOEt. Spar. sol. EtOH. Explosive.

Twiss, *J. Chem. Soc.*, 1914, 105, 1676.

2 : 4 : 6 : 2' : 4' : 6'-Hexanitrodiphenyl sulfide (Dipicryl sulfide)



$C_{12}H_4O_{12}N_6S$ MW, 456

Yellow cryst. M.p. 230-1° (226°). Deflagrates

182 2 : 4 : 6 : 2' : 4' : 6'-Hexanitro-3 : 5 : 3' : 5'-tetramethyldiphenylamine

at 290°. Sol. Me_2CO . Spar. sol. EtOH, Et_2O , $CHCl_3$. Insol. H_2O . Explosive.

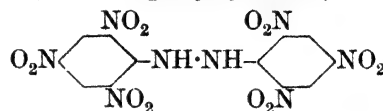
Twiss, *J. Chem. Soc.*, 1914, 105, 1675; D.R.P., 275,037, (*Chem. Zentr.*, 1914, II, 97).

van Duin, van Lennep, *Rec. trav. chim.*, 1920, 39, 157.

Hexanitrodirosorcinol.

See 2 : 4 : 6 : 2' : 4' : 6'-Hexanitro-3 : 5 : 3' : 5'-tetrahydroxydiphenyl.

2 : 4 : 6 : 2' : 4' : 6'-Hexanitrohydrazobenzene (N : N'-Dipicrylhydrazine)

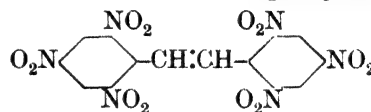


$C_{12}H_6O_{12}N_8$ MW, 454

Yellow needles from AcOH. M.p. 201-2°. Sol. EtOH, AcOH, AcOEt. Spar. sol. Et_2O , C_6H_6 , ligroin. $HNO_3 \rightarrow$ 2 : 4 : 6 : 2' : 4' : 6'-hexanitroazobenzene.

Leemann, Grandmougin, *Ber.*, 1908, 41, 1296.

2 : 4 : 6 : 2' : 4' : 6'-Hexanitrostilbene (2 : 4 : 6 : 2' : 4' : 6'-Hexanitrodiphenylethylene)

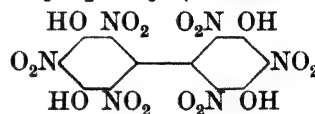


$C_{14}H_6O_{12}N_6$ MW, 450

Yellow needles from $PhNO_2$. M.p. 211° decomp. Spar. sol. Me_2CO . Insol. EtOH, Et_2O , ligroin.

Reich, Wetter, Widmer, *Ber.*, 1912, 45, 3060.

2 : 4 : 6 : 2' : 4' : 6'-Hexanitro-3 : 5 : 3' : 5'-tetrahydroxydiphenyl (Hexanitrodirosorcinol)

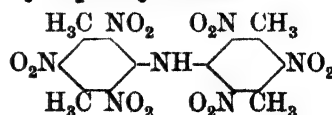


$C_{12}H_4O_{16}N_6$ MW, 488

Deflagrates at 245°. Sol. EtOH, Et_2O . Spar. sol. C_6H_6 . Insol. ligroin.

Friedrichs, *Chem. Zentr.*, 1916, I, 975.

2 : 4 : 6 : 2' : 4' : 6'-Hexanitro-3 : 5 : 3' : 5'-tetramethyldiphenylamine



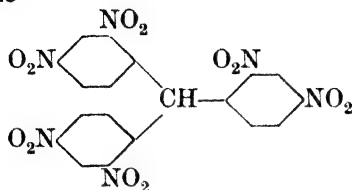
$C_{16}H_{13}O_{12}N_7$ MW, 495

2 : 4 : 2' : 4' : 2'' : 4''-Hexanitrotriphenyl-methane 183

Yellow cryst. from AcOH. M.p. 222°.

Blanksma, *Rec. trav. chim.*, 1906, **25**, 373.

2 : 4 : 2' : 4' : 2'' : 4''-Hexanitrotriphenyl-methane



$C_{19}H_{10}O_{12}N_6$ MW, 514

Plates from Me_2CO . M.p. 260° decomp. Spar. sol. usual org. solvents.

Baeyer, Villiger, *Ber.*, 1903, **36**, 2779.

Hexanol-1.

See *n*-Hexyl Alcohol.

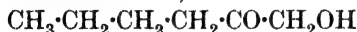
Hexanol-2.

See Methyl-*n*-butylcarbinol.

Hexanol-3.

See Ethylpropylcarbinol.

1-Hexanolone-2 (6-Hexanolone-5, 1-hydroxy-2-ketohexane, hydroxymethyl butyl ketone, valerylcarbinol, 2-ketohexanol-1)



$C_6H_{12}O_2$ MW, 116

B.p. 83-5°/15 mm.

Et ether: $C_8H_{16}O_2$. MW, 144. B.p. 79°/18 mm. Spar. sol. H_2O . Semicarbazone: m.p. 99°. *Oxime*: b.p. 125°/17 mm.

Levene, Haller, *J. Biol. Chem.*, 1928, **79**, 483.

Blaise, Picard, *Ann. chim.*, 1912, **25**, 257, 262.

1-Hexanolone-4 (6-Hexanolone-3, 1-hydroxy-4-ketohexane, ethyl 3-hydroxypropyl ketone, 3-propionyl-*n*-propyl alcohol, 3-propionylpropanol-1, 4-ketohexanol-1)



$C_8H_{12}O_2$ MW, 116

B.p. 115-16°/21 mm. Dist. at atm. press. \rightarrow 2-ethyl-4 : 5-dihydrofuran. $NaHg \rightarrow$ hexandiol-1 : 4.

Phenylurethane: m.p. 84°.

Wohlgemuth, *Ann. chim.*, 1914, **2**, 424.

1-Hexanolone-5.

See Acetobutyl Alcohol.

2-Hexanolone-5 (5-Hexanolone-2, 2-hydroxy-5-ketohexane, methyl 3-hydroxybutyl ketone, 5-ketohexanol-2, 4-aceto-sec.-*n*-butyl alcohol)



$C_6H_{12}O_2$ MW, 116

Hexantriol-1 : 2 : 5

B.p. 201-5°/270 mm., 140-2°/100 mm., 80-1°/10 mm. Misc. with H_2O , EtOH, Et_2O . Insol. conc. K_2CO_3 . Aq. Reduces warm Fehling's and $NH_3 \cdot AgNO_3$. $Na_2Cr_2O_7 + H_2SO_4 \rightarrow$ acetonyle acetone.

Oxime: yellow oil. Sol. H_2O , EtOH. Spar. sol. Et_2O . Semicarbazone: m.p. 149-50°.

Lipp, Scheller, *Ber.*, 1909, **42**, 1963.

3-Hexanolone-4.

See Diethylketol.

3-Hexanolone-5 (4-Hexanolone-2, 3-hydroxy-5-ketohexane, methyl 2-hydroxybutyl ketone, 5-ketohexanol-3, 1-aceto-sec.-*n*-butyl alcohol)



$C_6H_{12}O_2$ MW, 116

B.p. 90°/25 mm., 83°/15 mm. D_4^{15} 0.951. n_D^{18} 1.4368.

Pastureau, Zamenhof, *Compt. rend.*, 1926, **182**, 324.

I.G., E.P., 264,830, (*Chem. Abstracts*, 1928, **22**, 243).

Knorr, Weissenborn, Winthrop Chemical Co., U.S.P., 1,714,378, (*Chem. Abstracts*, 1929, **23**, 3477).

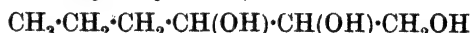
Hexanone-2.

See Methyl *n*-butyl Ketone.

Hexanone-3.

See Ethyl propyl Ketone.

Hexantriol-1 : 2 : 3 (1-*n*-Propylglycerol, 1 : 2 : 3-trihydroxyhexane)



$C_6H_{14}O_3$ MW, 134

M.p. 60-2°. B.p. 167-5-168°/14 mm. Hygroscopic. Bitter taste.

Triacetyl: b.p. 157-9°/15 mm.

Delaby, *Compt. rend.*, 1922, **175**, 1153.

Hexantriol-1 : 2 : 4 (1 : 2 : 4-Trihydroxyhexane)



$C_6H_{14}O_3$ MW, 134

B.p. 190-2°/30 mm.

Triacetyl: b.p. 273-6°, 168-9°/20 mm. D_4^{21} 1.086.

Fournier, *Bull. soc. chim.*, 1895, **13**, 121.

Hexantriol-1 : 2 : 5 (1 : 2 : 5-Trihydroxyhexane)



$C_6H_{14}O_3$ MW, 134

B.p. 181°/10 mm. D_4^{20} 1.1012. Misc. with H_2O , EtOH. Insol. Et_2O .

Traube, Lehmann, *Ber.*, 1901, **34**, 1982.
Markownikow, Kablukow, *Ber.*, 1881, **14**, 1711.

Hexantriol-2 : 3 : 4 (1-Methyl-3-ethylglycerol, 2 : 3 : 4-trihydroxyhexane)



$C_6H_{14}O_3$ MW, 134

B.p. 256-7°, 155-156.5°/20 mm. Misc. with H_2O , EtOH.

Reif, *Ber.*, 1908, **41**, 2742.

Delaby, Morel, *Compt. rend.*, 1925, **180**, 1409.

Hexantrione-2 : 3 : 4 (2 : 3 : 4-Triketohexane, methyl ethyl triketone)

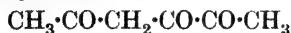


$C_6H_8O_3$ MW, 128

Red oil. B.p. 70°/18 mm. Sol. EtOH. Spar. sol. cold H_2O . Reduces cold Fehling's.

Sachs, Alsleben, *Ber.*, 1907, **40**, 2728.

Hexantrione-2 : 3 : 5 (2 : 3 : 5-Triketohexane, methyl acetonyl diketone)



$C_6H_8O_3$ MW, 128

Free ketone not isolated.

Trioxime: cryst. from EtOH. M.p. 159°.

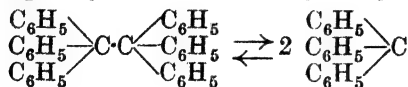
Angelico, Calvello, *Gazz. chim. ital.*, 1904, **34**, 45.

Angeli, Marchetti, *Atti accad. Lincei*, 1907, **16**, 274.

Hexaphenol.

See Hexahydroxybenzene.

Hexaphenylethane (Triphenylmethyl)



$C_{38}H_{30}$ MW, 486

The dimeric form (hexaphenylethane) is a colourless solid. Cryst. from Me_2CO , Me formate or Et formate. M.p. 145-7° decomp. Part. dissociates in sol. into triphenylmethyl (yellowish-red). Benzenoid-quinonoid tautomerism in both monomeric and dimeric forms may also exist. Sol. $CHCl_3$, CCl_4 , CS_2 , toluene. Mod. sol. C_6H_6 . Spar. sol. EtOH, Et_2O , Me_2CO , AcOEt. Prac. insol. ligroin. Heat of comb. C_f 2377.7 Cal., C_p 2380 Cal. Absorbs O from air with formation of triphenylmethyl peroxide. CrO_3 or $KMnO_4 \rightarrow$ triphenylcarbinol. $H (+ Pt) \rightarrow$

triphenylmethane. $I \rightarrow$ triphenylmethyl iodide. $NO \rightarrow$ nitrosotriphenylmethyl. $NO_2 \rightarrow$ nitrotriphenylmethyl and triphenylmethyl nitrite. $NOCl \rightarrow$ nitrosotriphenylmethyl and triphenylmethyl chloride. $PhOH \rightarrow$ 4-hydroxytetraphenylmethane and triphenylmethane. $CH_2N_2 \rightarrow$ hexaphenylpropane. Combines with Na. Combines with many org. solvents (hydrocarbons, ethers, aldehydes, ketones, esters, etc.) with formation of cryst. add. products readily dissociated on heating. Conducts electricity in liquid SO_2 sol.

Schlenk, Weickel, Herzenstein, *Ann.*, 1910, **372**, 17.

Schmidlin, *Ber.*, 1908, **41**, 423.

Schmidlin, Garcia-Banús, *Ber.*, 1912, **45**, 3191.

Wieland, *Ber.*, 1915, **48**, 1096.

Arbusow, Arbusow, *Ber.*, 1929, **62**, 1874.

Gomberg, Cone, *Ber.*, 1904, **37**, 2033.

Gomberg, Schoepfle, *J. Am. Chem. Soc.*, 1917, **39**, 1658.

Gomberg, *Chemical Reviews*, 1924, **1**, 91.

1 : 1 : 1 : 3 : 3 : 3-Hexaphenylpropane



$C_{39}H_{32}$ MW, 500

Prisms from ligroin. M.p. 216°. Sol. C_6H_6 . Spar. sol. EtOH, AcOH, ligroin.

Schlenk, *Ann.*, 1912, **394**, 184.

Hexatriacontane



$C_{36}H_{74}$ MW, 506

Plates from pet. ether. M.p. 76°. B.p. 265°/1 mm. D_4^{20} 0.764. Spar. sol. EtOH, Et_2O , $CHCl_3$, pet. ether. Volatile in steam.

Gascard, *Ann. chim.*, 1921, **15**, 344.

1 : 3 : 5-Hexatriene (sym.-Divinylethylene)



C_6H_8 MW, 80

Cis:

B.p. 78.5°/760 mm. D_4^{20} 0.7175. n_D^{20} 1.4577. Polymerises.

Trans:

B.p. 77-78.5°/764.4 mm. D_{15}^{25} 0.74229. n_D^{15} 1.4884. Polymerises.

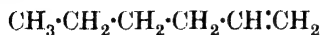
With Br in absence of HBr both forms give 1 : 2-dibromides; in presence of HBr 1 : 6-dibromides.

van Romburgh, van Dorssen, *J. Chem. Soc.*, 1906, **90**, I, 130.

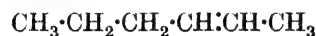
Farmer, Laroia, Switz, Thorpe, *J. Chem. Soc.*, 1927, 2948, 2953.

2-Hexenal-1.

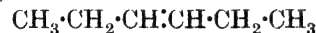
See 2-Propylacrolein.

1-Hexene (1-Hexylene, butylethylene α -hexylene) C_6H_{12} MW, 84F.p. — 139–40°. B.p. 63.35°. D^{20}_4 0.684, D^{20}_D 0.6734. n_D^{20} 1.3870. 86% $\text{H}_2\text{SO}_4 \rightarrow$ 2-hexanol + hexylsulphonic acid. $\text{KMnO}_4 \rightarrow$ formic and valeric acids.

Glycol: see Hexandiol-1:2.

Bourguel, *Bull. soc. chim.*, 1927, **41**, 1478.Dykstra, Lewis, Boord, *J. Am. Chem. Soc.*, 1930, **52**, 3401.Wilkinson, *J. Chem. Soc.*, 1931, 3057.**2-Hexene** (2-Hexylene, sym.-methylpropyl-ethylene, β -hexylene) C_6H_{12} MW, 84F.p. — 149°. B.p. 68.1°. D^0 0.6831, $D^{15.5}$ 0.66888. $n_D^{15.5}$ 1.38319.

Glycol: see Hexandiol-2:3.

v. Beresteyn, *Chem. Zentr.*, 1911, II, 1017.Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, **54**, 751.**3-Hexene** (3-Hexylene, sym.-diethylethylene, γ -hexylene) C_6H_{12} MW, 84B.p. 64°/753 mm. D^{10} 0.6807. n_D 1.394.

Glycol: see Hexandiol-3:4.

Lespiau, Wiemann, *Bull. soc. chim.*, 1929, **45**, 627.**Hexene-carboxylic Acid.**

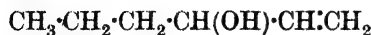
See Heptenic Acid.

Hexenic Acid.

See 2-Propylacrylic Acid, Hydrosorbic Acid, 3-Ethylidenebutiric Acid, and 2-Allylpropionic Acid.

Hexenic Aldehyde.

See 2-Propylacrolein.

1-Hexenol-3 (3-Hydroxy-1-hexene, propyl-vinylcarbinol) $\text{C}_6\text{H}_{12}\text{O}$ MW, 100

l.

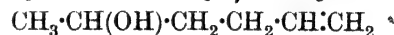
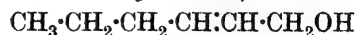
 $[\alpha]_D - 28.2^\circ$.Acid phthalate: m.p. 62–3°. Strychnine salt: m.p. 170–2°. Brucine salt: cryst. from Me_2CO . M.p. 118–20°.

dl.

B.p. 133.5–134°. D^{20}_4 0.851, D^{20}_D 0.834. n_D^{20} 1.4215.

p-Nitrobenzoyl: m.p. 60–2°.

Allophanate: m.p. 139.5–140°.

Acid phthalate: m.p. 58–60°. $[\alpha]_D - 16.05^\circ$ in EtOH.Delaby, *Compt. rend.*, 1922, **175**, 967.Kenyon, Snellgrove, *J. Chem. Soc.*, 1925, **127**, 1176.**1-Hexenol-4** (4-Hydroxy-1-hexene, ethylallyl-carbinol) $\text{C}_6\text{H}_{12}\text{O}$ MW, 100B.p. 129–31°. $[\alpha]_D^{25} + 0.3^\circ$ without solvent.Levene, Haller, *J. Biol. Chem.*, 1928, **76**, 420.**1-Hexenol-5** (5-Hydroxy-1-hexene, methyl-allylomethylcarbinol, methyl- γ -butenylcarbinol) $\text{C}_6\text{H}_{12}\text{O}$ MW, 100B.p. 140°/759 mm. D^0 0.8614. Spar. sol. H_2O . $\text{CrO}_3 \rightarrow$ allylacetone + acetic acid. $\text{HBr} \rightarrow$ 2:5-dibromohexane.Gardner, Perkin, *J. Chem. Soc.*, 1907, **91**, 851.**1-Hexenol-6** (6-Hydroxy-1-hexene, 4-vinyl-n-butyl alcohol, 5-hexenyl alcohol) $\text{C}_6\text{H}_{12}\text{O}$ MW, 100Me ether: $\text{C}_7\text{H}_{14}\text{O}$. MW, 114. Liq. with strong odour. B.p. 125°. D^0 0.8065, $n_D^{12.5}$ 1.4147.Et ether: $\text{C}_8\text{H}_{16}\text{O}$. MW, 128. Liq. with strong odour. B.p. 143°. D^0 0.8103, $D^{12.5}$ 0.7998. $n_D^{12.5}$ 1.4184.Dionneau, *Bull. soc. chim.*, 1913, **13**, 524; *Ann. chim.*, 1915, **3**, 215.**2-Hexenol-1** (1-Hydroxy-2-hexene, 3-propyl-allyl alcohol, 2-hexenyl alcohol) $\text{C}_6\text{H}_{12}\text{O}$ MW, 100B.p. 158–60°. D^{16} 0.8490. n_D^{16} 1.4403.

2-Naphthylurethane: m.p. 76°.

Bouis, *Ann. chim.*, 1928, **9**, 402.**2-Hexenol-4** (4-Hydroxy-2-hexene, ethylprop-enylcarbinol) $\text{C}_6\text{H}_{12}\text{O}$ MW, 100

Liq. with strong odour. B.p. 59 $\frac{1}{2}$ /27 mm. D_4^{14} 0.8422. n_D^{14} 1.43286. Heat with KHSO_4 \rightarrow 2:4-hexadiene.

Me ether: $\text{C}_7\text{H}_{14}\text{O}$. MW, 114. B.p. 110–13°.

Auwers, Westerman, *Ber.*, 1921, **54**, 2993.

Prévost, *Ann. chim.*, 1928, **10**, 147.

3-Hexenol-1 (1-Hydroxy-3-hexene, 3-propyldenepropyl alcohol, 3-hexenyl alcohol)

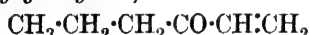


$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. 156–7°, 55–6°/9 mm. D^{15} 0.8508. n_D^{20} 1.48030. $\text{KMnO}_4 \rightarrow$ propionic acid.

Walbaum, *J. prakt. Chem.*, 1917, **96**, 245.

1-Hexenone-3 (Propyl vinyl ketone, 3-keto-1-hexene, butyrylethylene)

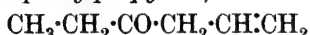


$\text{C}_6\text{H}_{10}\text{O}$ MW, 98

B.p. 24°/10 mm. Polymerises.

Blaise, Maire, *Bull. soc. chim.*, 1908, **3**, 270.

1-Hexenone-4 (Ethyl allyl ketone, 4-keto-1-hexene, 3-propionylpropylene)



$\text{C}_6\text{H}_{10}\text{O}$ MW, 98

B.p. 124–124.2° (126–7°). D_4^{20} 0.84976. n_D^{20} 1.42443. Heat of comb. C_v 857 Cal.

Oxime: b.p. 84°/13 mm.

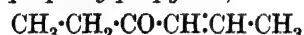
Blaise, *Bull. soc. chim.*, 1905, **33**, 40.

Coppens, *Bull. Soc. chim. Belg.*, 1929, **38**, 310.

1-Hexenone-5.

See Allylacetone.

2-Hexenone-4 (Ethyl propenyl ketone, 4-keto-2-hexene, 1-propionylpropylene)



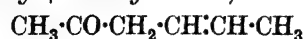
$\text{C}_6\text{H}_{10}\text{O}$ MW, 98

B.p. 140.4–140.6° (137°). D_4^{20} 0.85587. n_D^{20} 1.43911. 2 Mols. semicarbazide \rightarrow ethyl propenyl ketone semicarbazide semicarbazone, m.p. 157° decomp.

Blaise, *Bull. soc. chim.*, 1905, **33**, 47.

Coppens, *Bull. soc. chim. Belg.*, 1929, **38**, 310.

2-Hexenone-5 (1-Aceto-2-butylene, 5-keto-2-hexene, methyl β -butenyl ketone)



$\text{C}_6\text{H}_{10}\text{O}$ MW, 98

B.p. 132.5–133.5°. D_4^{20} 0.91915. n_D^{20} 1.41806.

Baudrenghien, *Bull. soc. chim. Belg.*, 1922, **31**, 160.

3-Hexenone-2 (Propylideneacetone, 2-keto-3-hexene, methyl α -butenyl ketone, 1-aceto-1-butylene)



$\text{C}_6\text{H}_{10}\text{O}$ MW, 98

B.p. 136–7°. D_4^{16} 0.8601. n_D^{16} 1.4447.

Grignard, Fluchaire, *Ann. chim.*, 1928, **9**, 11.

Hexenyl Alcohol.

See 1-Hexenol-6, 2-Hexenol-1 and 3-Hexenol-1.

1-Hexine (n-Butylacetylene)



C_6H_{10} MW, 82

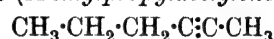
B.p. 71.35°, 12.5°/75 mm. D^0 0.7336, D^{15} 0.7193. n_D^{25} 1.402.

$2\text{C}_6\text{H}_{10}\cdot\text{Hg}$: m.p. 96.2–96.4°.

Bourguel, *Ann. chim.*, 1925, **3**, 222, 380.

Grignard, Lapayre, Faki, *Compt. rend.*, 1928, **187**, 517.

2-Hexine (Methylpropylacetylene)

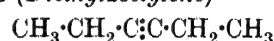


C_6H_{10} MW, 82

F.p. –92°. B.p. 83.8°. D^0 0.7494, D^{15} 0.7377.

Harzer, *Chem. Zentr.*, 1914, II, 1171.

3-Hexine (Diethylacetylene)

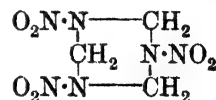


C_6H_{10} MW, 82

F.p. –51°. B.p. 79–80°/770 mm. D^{20} 0.724. n_D 1.4115.

Lespiau, Wiemann, *Bull. soc. chim.*, 1929, **45**, 627.

Hexogen (Cyclonite, cyclotrimethylenetrinitramine, 1:3:5-trinitrohexahydro-1:3:5-triazine, trimethylenetrinitroamine, trinitrotrimethylenetrinitramine)



$\text{C}_3\text{H}_6\text{O}_6\text{N}_6$ MW, 222

Cryst. from Me_2CO . M.p. 203.5°. Sol. Me_2CO , AcOH . Sp. sol. EtOH . Insol. H_2O . Explosive.

von Herz, E.P., 145,791, (*Chem. Abstracts*, 1920, **14**, 3533).

Desvergues, *Chimie et Industrie*, 1932, **28**, 1038.

2-Hexenylcarbinol.

See 2-Heptenol-1.

n-Hexoic Acid.

See n-Caproic Acid.

n-Hexylacetylene.

See 1-Octine.

n-Hexyl Alcohol (*Hexanol-1*, 1-hydroxy-hexane) $\text{C}_6\text{H}_{14}\text{O}$ MW, 102B.p. 155.2–155.7° (156.4–156.8°, 157–157.5°/755 mm.). D_4^{20} 0.8333, D_{20}^{20} 0.8204. n_D^{20} 1.41326.Formyl: b.p. 153.6°. D_4^0 0.8977.Acetyl: b.p. 169.2°. D_4^0 0.8902.Butyryl: b.p. 205.1°. D_4^0 0.8825.Benzoyl: b.p. 272°/770 mm. D_4^{17} 0.9985.

Et ether: see Ethyl n-hexyl Ether.

p-Nitrophenylurethane: m.p. 103°.

Dreger, *Organic Syntheses*, 1926, VI, 54.Lieben, Janacek, *Ann.*, 1877, **187**, 135.Bouveault, Blanc, D.R.P., 164,294, (*Chem. Zentr.*, 1905, II, 1700).Derick, Bissell, *J. Am. Chem. Soc.*, 1916, **38**, 2484.Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.**Hexyl Aldehyde.**

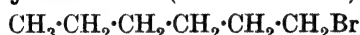
See Caproic Aldehyde.

n-Hexylamine.

See 1-Amino-n-hexane.

Hexylaminoethyl Alcohol.

See N-2-Hydroxyethylhexylamine.

n-Hexyl bromide (1-Bromohexane) $\text{C}_6\text{H}_{13}\text{Br}$ MW, 165B.p. 155.5°/743.8 mm. (153.2–153.5°/766.3 mm.), 87.8–88.2°/90 mm. D_4^0 1.1992 (1.19807), D_{20}^{20} 1.1763, D_{20}^{20} 1.16899. n_D^{20} 1.44778, n_D^{20} 1.4452.Lieben, Janacek, *Ann.*, 1877, **187**, 137.**Hexyl chloride.**

See Chlorohexane.

Hexyl 2 : 4-dihydroxyphenyl Ketone.

See 4-n-Heptylresorcinol.

Hexylene.

See Hexene.

Hexylene Aldehyde.

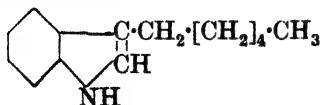
See 2-Propylacrolein.

Hexyl fluoride.

See Fluorohexane.

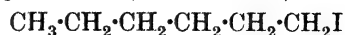
Hexyl p-hydroxyphenyl sulphide.

See under Thiohydroquinone.

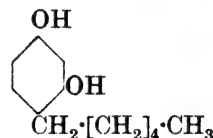
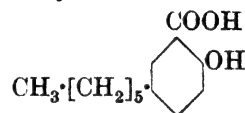
3-n-Hexylindole $\text{C}_{14}\text{H}_{19}\text{N}$

MW, 201

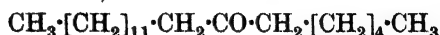
Yellow liq. B.p. 212–24°/14 mm.

Korczyński, Brydowna, Kierzek, *Gazz. chim. ital.*, 1926, **56**, 906.**n-Hexyl iodide** (1-Iodohehexane) $\text{C}_6\text{H}_{13}\text{I}$ MW, 212B.p. 179.5° (180°/763 mm.), 82°/28 mm., 73°/23 mm., 51°/6 mm. D_4^0 1.473, D_{20}^{20} 1.4414 (1.4387). n_D^{20} 1.4925 (1.4929).Zelinski, Przewalski, *Chem. Zentr.*, 1908, II, 1854.Karvonen, *Chem. Zentr.*, 1912, II, 1271.**Hexylmalonic Acid.**

See Heptane-1 : 1-dicarboxylic Acid.

4-n-Hexylresorcinol (2 : 4-Dihydroxyhexylbenzene, 1-[2 : 4-dihydroxyphenyl]-hexane) $\text{C}_{12}\text{H}_{18}\text{O}_2$ MW, 194Needles from ligroin. M.p. 67.5–69° (68–70°). B.p. 178–80°/6–7 mm. Sol. EtOH, Et₂O, CHCl₃, Me₂CO. Spar. sol. ligroin. Prac. insol. H₂O. Greenish-yellow col. with FeCl₃ in EtOH. Urinary antiseptic.Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1691.Cox, *Rec. trav. chim.*, 1931, **50**, 850.Hirzel, U.S.P., 1,717,105, (*Chem. Abstracts*, 1929, **23**, 3717).Dohme, E.P., 219,922, (*Chem. Abstracts*, 1925, **19**, 705).**5-Hexylsalicylic Acid** $\text{C}_{13}\text{H}_{18}\text{O}_3$ MW, 222

Cryst. from ligroin. M.p. 86° (83–4°). Disinfectant.

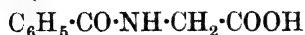
Hoffmann-La Roche A.-G., Swiss P., 127,649, (*Chem. Abstracts*, 1929, **23**, 1217).Cox, *J. Am. Chem. Soc.*, 1930, **52**, 357.**n-Hexyl n-tridecyl Ketone** (*Eicosanone-7*, 7-ketoeicosane) $\text{C}_{20}\text{H}_{40}\text{O}$

MW, 296

B.p. 210–11°/11 mm.

Krafft, *Ber.*, 1882, **15**, 1717.

Hippuric Acid (*Benzoylaminoacetic acid*, *benzoylglycine*)



$\text{C}_9\text{H}_9\text{O}_3\text{N}$ MW, 179

Prisms from H_2O or EtOH. M.p. 187° (188.5°). $k = 15.7 \times 10^{-5}$ (2.3×10^{-4}). Sol. H_2O , EtOH, AcOEt. Spar. sol. Et_2O , CHCl_3 , C_6H_6 . Insol. CS_2 , pet. ether. $\text{H}_2\text{SO}_4 + \text{PbO}_2 \rightarrow$ benzamide. ZnCl_2 at 300° \rightarrow benzonitrile. Conc. $\text{HNO}_3 \rightarrow$ oxalic acid.

Me ester: $\text{C}_{10}\text{H}_{11}\text{O}_3\text{N}$. MW, 193. Prisms. M.p. 85°. Sol. H_2O , Et_2O .

Et ester: $\text{C}_{11}\text{H}_{13}\text{O}_3\text{N}$. MW, 207. Needles from H_2O . M.p. 67.5°. D_{25}^{20} 1.043. Sol. H_2O , EtOH, Et_2O . Steam dist. \rightarrow hippuric acid.

Phenyl ester: $\text{C}_{15}\text{H}_{13}\text{O}_3\text{N}$. MW, 255. Plates from EtOH. M.p. 104°. Sol. EtOH, Et_2O , C_6H_6 , CHCl_3 . Spar. sol. CS_2 . Insol. pet. ether.

Chloride: $\text{C}_9\text{H}_8\text{O}_2\text{NCl}$. MW, 197.5. Indefinite m.p. Sol. C_6H_6 . Insol. pet. ether.

Amide: $\text{C}_9\text{H}_{10}\text{O}_2\text{N}_2$. MW, 178. Cryst. from H_2O . M.p. 183°. Insol. cold EtOH, Et_2O . Sublimes.

Nitrile: $\text{C}_9\text{H}_8\text{ON}_2$. MW, 160. Plates from EtOH. M.p. 144°. Sol. EtOH, C_6H_6 , CHCl_3 . Spar. sol. ligroin.

Hydrazide: see Hippuryl hydrazide.

Baum, *Z. physiol. Chem.*, 1884, **9**, 465.

Fischer, *Ber.*, 1905, **38**, 612.

Bergell, Wülfing, *Z. physiol. Chem.*, 1910, **64**, 362.

Johnson, Burnham, *Am. Chem. J.*, 1912, **47**, 235.

Hippuric Aldehyde (*Benzoylaminoacetaldehyde*)



$\text{C}_9\text{H}_9\text{O}_2\text{N}$ MW, 163

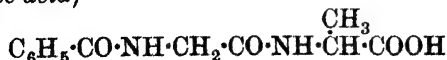
Resin. Reduces Fehling's.

B.HCl: cryst. M.p. 110–15° decomp. Sol. H_2O , EtOH. Spar. sol. C_6H_6 . Insol. Et_2O . Br \rightarrow hippuric acid.

Phenylhydrazone: prisms from C_6H_6 . M.p. 107–8°. Sol. EtOH. Spar. sol. Et_2O , C_6H_6 .

Fischer, *Ber.*, 1893, **26**, 465.

Hippuryl- α -alanine (*Hippuryl-1-aminopropionic acid*)



$\text{C}_{12}\text{H}_{14}\text{O}_4\text{N}_2$ MW, 250

Needles from H_2O . M.p. 202°. Sol. EtOH. Insol. Et_2O , C_6H_6 , CHCl_3 .

Me ester: $\text{C}_{13}\text{H}_{16}\text{O}_4\text{N}_2$. MW, 264. Needles from H_2O . M.p. 136°.

Et ester: $\text{C}_{14}\text{H}_{18}\text{O}_4\text{N}_2$. MW, 278. Needles from H_2O . M.p. 124–6°. Sol. EtOH, C_6H_6 , CHCl_3 . Insol. Et_2O , ligroin.

Curtius, Lambotte, *J. prakt. Chem.*, 1904, **70**, 117.

Hippuryl- β -alanine.

See Hippuryl-2-aminopropionic Acid.

Hippurylaminoacetic Acid.

See Hippurylglycine.

i-Hippuryl-2-aminobutyric Acid



$\text{C}_{13}\text{H}_{16}\text{O}_4\text{N}_2$ MW, 264

Needles from H_2O . M.p. 122°. Sol. EtOH. Insol. Et_2O , C_6H_6 .

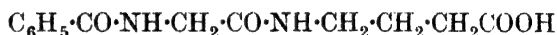
Me ester: $\text{C}_{14}\text{H}_{18}\text{O}_4\text{N}_2$. MW, 278. Needles from H_2O . M.p. 104°. Sol. EtOH. Spar. sol. C_6H_6 . Insol. Et_2O .

Et ester: $\text{C}_{15}\text{H}_{20}\text{O}_4\text{N}_2$. MW, 292. Needles from H_2O . M.p. 80°. Sol. EtOH. Spar. sol. C_6H_6 , Et_2O , AcOH.

Amide: $\text{C}_{13}\text{H}_{17}\text{O}_3\text{N}_3$. MW, 263. Plates from EtOH. M.p. 173°. Sol. EtOH, H_2O . Insol. Et_2O , C_6H_6 .

Curtius, Gumlich, *J. prakt. Chem.*, 1904, **70**, 206.

Hippuryl-3-aminobutyric Acid



$\text{C}_{13}\text{H}_{16}\text{O}_4\text{N}_2$ MW, 264

Needles from H_2O . M.p. 175°. Sol. EtOH. Insol. C_6H_6 .

NH₄ salt: cryst. M.p. 161–2°.

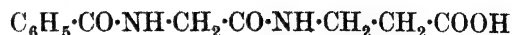
Et ester: $\text{C}_{15}\text{H}_{20}\text{O}_4\text{N}_2$. MW, 292. Needles from H_2O . M.p. 94°. Spar. sol. Et_2O , C_6H_6 .

Curtius, Müller, *J. prakt. Chem.*, 1904, **70**, 225.

Hippuryl-1-aminopropionic Acid.

See Hippuryl- α -alanine.

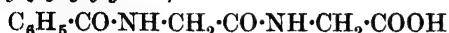
Hippuryl-2-aminopropionic Acid (*Hippuryl- β -alanine*)



$\text{C}_{12}\text{H}_{14}\text{O}_4\text{N}_2$ MW, 250

Cryst. M.p. 183–5°. Sol. EtOH. Spar. sol. H_2O , CHCl_3 .

Baumann, Ingvaldsen, *J. Biol. Chem.*, 1918, **35**, 276.

Hippurylglycine (*Hippurylaminoacetic acid, benzoylglycylglycine*)
 $\text{C}_{11}\text{H}_{12}\text{O}_4\text{N}_2$ MW, 236

Needles from H_2O . M.p. 208° (206.5°). Sol. EtOH. Aq. Spar. sol. abs. EtOH. Insol. Et_2O , CHCl_3 , C_6H_6 , CS_2 . Conc. alkalis \rightarrow hippuric acid + glycine.

Et ester: $\text{C}_{13}\text{H}_{16}\text{O}_4\text{N}_2$. MW, 264. Needles from H_2O . M.p. 117° . Sol. EtOH. Spar. sol. H_2O , Et_2O , CHCl_3 .

Amide: $\text{C}_{11}\text{H}_{13}\text{O}_3\text{N}_3$. MW, 235. Plates. M.p. 202° . Sol. EtOH. Spar. sol. Et_2O . Insol. H_2O , CHCl_3 , C_6H_6 .

Azide: $\text{C}_{11}\text{H}_{11}\text{O}_3\text{N}_5$. MW, 261. Needles. M.p. $109-10^\circ$.

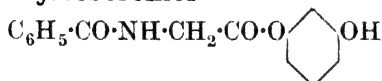
Fischer, *Ber.*, 1905, **38**, 608.

Curtius, *J. prakt. Chem.*, 1916, **94**, 120.

Hippuryl hydrazide (*Benzoylaminoacetylhydrazide*)
 $\text{C}_9\text{H}_{13}\text{O}_2\text{N}_3$ MW, 195

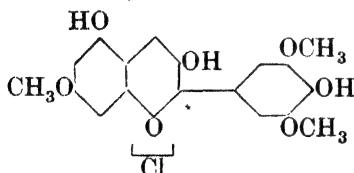
Needles. M.p. 162.5° . Mod. sol. H_2O . Sol. hot EtOH. Spar. sol. Et_2O . Reduces Fehling's. $\text{HNO}_2 \rightarrow$ hippurazide.

Curtius, *J. prakt. Chem.*, 1895, **52**, 243.

Hippurylresorcinol
 $\text{C}_{15}\text{H}_{13}\text{O}_4\text{N}$ MW, 271

Cryst. from AcOEt. M.p. 144° . Sol. EtOH, AcOH. Decomp. in alk. sol.

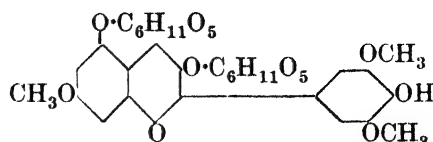
Fischer, *Ber.*, 1905, **38**, 2931.

Hirsutidin chloride (7:3':5'-Trimethoxydelphinidin chloride)
 $\text{C}_{18}\text{H}_{17}\text{O}_7\text{Cl}$ MW, 380.5

Red prisms. Sol. $\text{H}_2\text{O} \rightarrow$ red col. fading on boiling: col. restored by acids. Sol. 0.1N/NaOH \rightarrow purple-blue col. \rightarrow crimson-blue (dichroic) \rightarrow emerald green.

Karrer, Widmer, *Helv. Chim. Acta*, 1927, **10**, 758.

Bradley, Robinson, Schwarzenbach, *J. Chem. Soc.*, 1930, **132**, 808.

Hirsutin
 $\text{C}_{30}\text{H}_{37}\text{O}_{17}$

MW, 669

Colouring matter of *Primula hirsuta*. Diglucoside of hirsutidin.

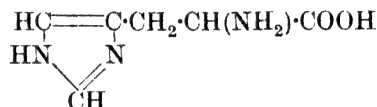
Chloride: $\text{C}_{30}\text{H}_{37}\text{O}_{17}\text{Cl}$. MW, 704.5. Opaque needles from MeOH-HCl. Aq. M.p. $150-3^\circ$ decomp. NaOAc \rightarrow reddish-violet col. $\text{FeCl}_3 \rightarrow$ stable orange col.

Robinson, Todd, *J. Chem. Soc.*, 1932, **135**, 2293.

See also first reference above.

Histamine.

See 4-[ω -Aminoethyl]-glyoxaline.

Histidine (1-Amino-2-iminazolypropionic acid, 2-[4-iminazoly]- α -alanine)
 $\text{C}_6\text{H}_9\text{O}_2\text{N}_3$

MW, 155

Constituent of nearly all complete proteins. Sol. H_2O . Mod. sol. EtOH. $[\alpha]_D^{20} = -39.74^\circ$ in H_2O . Dextrorotatory in HCl. Gives biuret test. Br. Aq. \rightarrow red col.

Me ester: $\text{C}_7\text{H}_{11}\text{O}_2\text{N}_3$. MW, 169. $B, 2\text{HCl}$: cryst. M.p. 196° .

Picrolonate: yellow needles. M.p. 220° .

Betaine: see Hecymin.

Pyman, *J. Chem. Soc.*, 1916, **109**, 186.

Holarrhenine
 $\text{C}_{24}\text{H}_{38}\text{ON}_2$

MW, 370

Alkaloid present in *Holarrhena congolensis*. Silky needles from AcOEt. M.p. $197-8^\circ$. Sol. EtOH, CHCl_3 . Spar. sol. Me_2CO , Et_2O . Insol. H_2O . $[\alpha]_D = -7.1^\circ$ in CHCl_3 .

B, HBr : needles + $3\text{H}_2\text{O}$ from H_2O . Loses H_2O at 100° . M.p. anhyd. $265-8^\circ$. $[\alpha]_D$ (anhyd.) + 11.0° .

Acetyl deriv.: plates. M.p. 180° .

Pyman, *J. Chem. Soc.*, 1919, **115**, 163.

Holarrhimine
 $\text{C}_{21}\text{H}_{36}\text{ON}_2$

MW, 332

Present in *Holarrhena antidysenterica*. Needles from AcOEt. M.p. 183° . Sol. EtOH, CHCl_3 . Spar. sol. Et_2O , pet. ether. $[\alpha]_D^{25} = -14.19^\circ$ in

CHCl_3 . A diacid base. Contains no $-\text{OCH}_3$ or $-\text{N}\cdot\text{CH}_3$ groups. Possesses 3 active H atoms.

$B, 2\text{HCl}$: plates from H_2O . M.p. 345° decomp. Sol. EtOH. Mod. sol. H_2O . Spar. sol. HCl.Aq. $[\alpha]_D^{25} - 22.80^\circ$ in MeOH.

$B, 2\text{HBr}$: plates from H_2O . M.p. $358-60^\circ$ decomp.

$B, \text{H}_2\text{SO}_4$: m.p. 337° . Spar. sol. H_2O and all org. solvents.

$B, \text{H}_2\text{PtCl}_6$: powder. Darkens at 270° , chars above 300° without melting. Insol. H_2O , EtOH.

Picrate: yellow plates (hydrated) from H_2O . M.p. $108-10^\circ$. M.p. anhyd. $198-200^\circ$ decomp.

Siddiqui, Pillay, *J. Indian Chem. Soc.*, 1932, 9, 561.

Holarrhine

$\text{C}_{20}\text{H}_{38}\text{O}_3\text{N}_2$ MW, 354

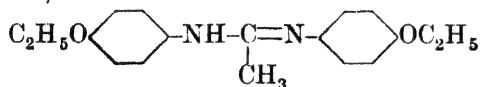
Present in *Holarrhena antidysenterica*. Needles from MeOH-AcOEt. M.p. 240° . Sol. MeOH, EtOH. Spar. sol. CHCl_3 . Insol. AcOEt, Et₂O, pet. ether. $[\alpha]_D^{25} - 17.01^\circ$ in MeOH. Secondary base.

$B, \text{H}_2\text{PtCl}_6$: darkens at 270° , chars at 300° .

Picrate: darkens at 275° , does not melt below 320° .

Siddiqui, Pillay, *J. Indian Chem. Soc.*, 1932, 9, 562.

Holocaine (NN' -Di-[p-ethoxyphenyl]-acetamidine)



$\text{C}_{18}\text{H}_{20}\text{O}_2\text{N}_2$ MW, 296

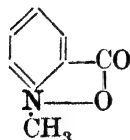
Needles. M.p. 117° . Sol. EtOH, C_6H_6 , Et₂O. Spar. sol. H_2O , ligroin.

B, HCl : phenacaine. Cryst. $+ 1\text{H}_2\text{O}$ from H_2O . M.p. anhyd. 189° . Sol. EtOH, CHCl_3 . Reduces KMnO_4 instantly. Gives positive diazo reaction. Local anæsthetic.

Tauber, D.R.P., 79,868, (*Chem. Zentr.*, 1897, I, 1100).

Kennert, *Chem. Zentr.*, 1897, II, 556.

Homarine



$\text{C}_7\text{H}_7\text{O}_2\text{N}$ MW, 137

B, HCl : needles from H_2O . M.p. $170-175^\circ$ decomp. Spar. sol. MeOH, EtOH.

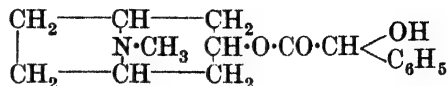
B, HAuCl_4 : prisms from HCl. M.p. $188-90^\circ$.

$B, \text{H}_2\text{PtCl}_6$: plates from HCl. M.p. $197-8^\circ$.

Picrate: plates. M.p. $155-60^\circ$.

Hoppe-Seyler, *Z. physiol. Chem.*, 1933, 222, 105.

Homatropine (*Phenylglycollyltropine, mandelyltropine*)



$\text{C}_{15}\text{H}_{19}\text{O}_2\text{N}$ MW, 245

Prisms from Et₂O. M.p. $99-100^\circ$. Sol. Et₂O, CHCl_3 . Spar. sol. H_2O . *Picric acid* \rightarrow yellow ppt. Powerful mydriatic.

B, HCl : prisms. M.p. $219-27^\circ$.

B, HBr : plates. M.p. $217-18^\circ$. Sol. H_2O . Salt commonly used in medicine.

$B, \text{H}_2\text{SO}_4$: needles. M.p. $222-6^\circ$.

Methobromide: cryst. M.p. $192-6^\circ$.

Me ether: see Methylyhomatropine.

Chemnitius, *J. prakt. Chem.*, 1927, 117, 144.

Homoallantoic Acid (1:1-Diureidopropionic acid)



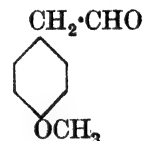
$\text{C}_5\text{H}_{10}\text{O}_4\text{N}_4$ MW, 190

Cryst. M.p. 155° decomp. Insol. H_2O . $\text{H}_2\text{O} \rightarrow$ urea + pyruvic acid.

Et ester: $\text{C}_7\text{H}_{14}\text{O}_4\text{N}_4$. MW, 218. Cryst. M.p. 200° decomp. Sol. EtOH-Py. Spar. sol. hot EtOH. Insol. H_2O and most org. solvents. H_2O at $100^\circ \rightarrow$ urea + pyruvic Et ester.

Simon, *Compt. rend.*, 1904, 138, 372.

Homoanisaldehyde (p-Methoxy- α -toluic aldehyde, p-methoxyphenylacetaldehyde)



$\text{C}_9\text{H}_{10}\text{O}_2$ MW, 150

B.p. $255-6^\circ$, $117.5-118^\circ/9$ mm. Spar. sol. H_2O . D_4^{20} 1.096. n_D^{20} 1.5359. Reduces warm Fehling's.

Oxime: plates. M.p. 121° (120°).

Phenylhydrazone: m.p. 95° .

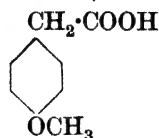
Semicarbazone: cryst. from C_6H_6 . M.p. $181-2^\circ$.

Tiffeneau, *Ann. chim. phys.*, 1907, 10, 350.

Mannich, Jacobsohn, *Ber.*, 1910, 43, 195.

Harries, Adam, *Ber.*, 1916, 49, 1032.

Homoanisic Acid (*p*-Methoxy- α -toluic acid, *p*-methoxyphenylacetic acid)



$\text{C}_9\text{H}_{10}\text{O}_3$ MW, 166
Plates from H_2O . M.p. $85-7^\circ$. Sol. EtOH, Et₂O.

Me ester: $\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. B.p. $263-5^\circ$, $155-7^\circ/23$ mm. D_4^{20} 1.135.

Et ester: $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. B.p. $138-40^\circ/7$ mm.

Amide: $\text{C}_9\text{H}_{11}\text{O}_2\text{N}$. MW, 165. Plates from H_2O . M.p. 175° .

Chloride: $\text{C}_9\text{H}_9\text{O}_2\text{Cl}$. MW, 184.5. B.p. $143^\circ/10$ mm.

Nitrile: *p*-methoxybenzyl cyanide. $\text{C}_9\text{H}_9\text{ON}$. MW, 147. B.p. $285-90^\circ$. D_4^{20} 1.10013, D_4^{20} 1.08454. n_D^{16} 1.53175.

Tiffeneau, *Ann. chim. phys.*, 1907, 10, 351.

Cain, Simonsen, Smith, *J. Chem. Soc.*, 1913, 103, 1037.

Kondo, Oshima, *Journal of the Pharmaceutical Society of Japan*, 1931, 51, 979.

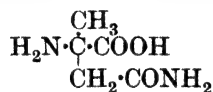
Homoanthranilic Acid.

See 3-Amino-*p*-toluic Acid.

Homoantipyrene.

See 5-Methyl-1-ethyl-2-phenylpyrazolone-3.

Homoasparagine (*C*-Methylasparagine, 1-amino-1-methylsuccinic mono-amide)



$\text{C}_5\text{H}_{10}\text{O}_3\text{N}_2$ MW, 146

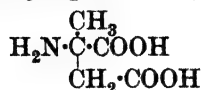
Cryst. from EtOH. M.p. $254-6^\circ$ decomp.

Amide: $\text{C}_5\text{H}_{11}\text{O}_2\text{N}_3$. MW, 145. M.p. $266-7^\circ$ decomp.

Körner, Menozzi, *Atti Accad. Lincei*, 1893, 2, ii, 370.

Migliacci, Furia, *Gazz. chim. ital.*, 1928, 58, 103.

Homoaspartic Acid (1-Amino-1-methylsuccinic acid, *C*-methylaspartic acid)



$\text{C}_5\text{H}_9\text{O}_4\text{N}$ MW, 147

dl-.

Cryst. + $1\text{H}_2\text{O}$. M.p. $232-4^\circ$. Sol. EtOH. Aq. Spar sol. EtOH.

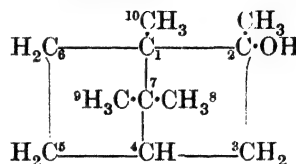
Active-.

Cryst. + $1\text{H}_2\text{O}$. M.p. $166-7^\circ$. Sol. H_2O .

Amide: see Homoasparagine.

Piutti, *Gazz. chim. ital.*, 1898, 28, ii, 148, 155.

Homoborneol (2-Methylborneol, 2-hydroxy-2-methylcamphane, 2-methylcamphanol-2, 1:2:7:7-tetramethylbicyclo-[1, 2, 2,]-heptanol-2)



$\text{C}_{11}\text{H}_{20}\text{O}$ MW, 168

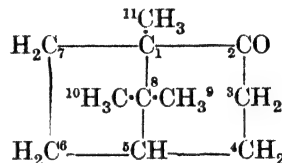
M.p. $154-6^\circ$. B.p. 193° (slight loss of H_2O). $[\alpha]_D + 30.79^\circ$ in EtOH. Volatile in steam.

Nametkin, Schlesinger, *Ann.*, 1923, 432, 223.

Zelinsky, *Ber.*, 1901, 34, 2883.

Ruzicka, *Helv. Chim. Acta*, 1918, 1, 116.

Homocamphor (1:8:8-Trimethylbicyclo-[1, 2, 3,]-octanone-2)



$\text{C}_{11}\text{H}_{18}\text{O}$ MW, 166

Cryst. mass. M.p. $189-90^\circ$. Sublimes below m.p. Sol. H_2O . Similar to camphor in solubility in org. solvents. $[\alpha]_D - 112.9^\circ$ in C_6H_6 . Volatile in steam.

Semicarbazone: needles from EtOH. M.p. $250-2^\circ$.

Oxime: m.p. $167-8^\circ$.

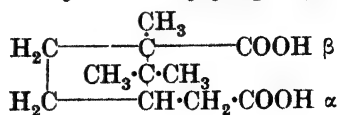
3-Isonitroso deriv.: plates from C_6H_6 . M.p. $167-8^\circ$.

Lapworth, Royle, *J. Chem. Soc.*, 1920, 117, 747.

β -Homocamphor.

See Homoepicamphor.

Homocamphoric Acid (1:2:2-Trimethyl-3-carboxymethylcyclopentane-1-carboxylic acid, 2:2:3-trimethyl-3-carboxycyclopentylacetic acid)



$\text{C}_{11}\text{H}_{18}\text{O}_4$ MW, 214

Needles from PhNO_2 . M.p. 233° . Spar. sol. most org. solvents.

α -Et ester: $\text{C}_{13}\text{H}_{22}\text{O}_4$. MW, 242. M.p. 56° .

Di-Et ester: $\text{C}_{15}\text{H}_{26}\text{O}_4$. MW, 270. B.p. 175° .

β -Phenyl ester: $\text{C}_{17}\text{H}_{23}\text{O}_4$. MW, 291. M.p. $152-3^\circ$.

α -Et- β -phenyl ester: m.p. 51° . B.p. $221^\circ/12\text{ mm.}$

α -Nitrile: see Cyanocamphoric Acid.

Palfray, *Ann. chim.*, 1923, **20**, 297.

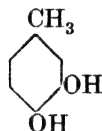
Lapworth, Royle, *J. Chem. Soc.*, 1920, **117**, 750.

Haller, *Compt. rend.*, 1896, **122**, 446.

β-Homocamphoric Acid.

See Homoepticamphoric Acid.

Homocatechol (4-Methylcatechol, 3:4-dihydroxytoluene)



$\text{C}_7\text{H}_8\text{O}_2$

MW, 124

Prisms from C_6H_6 . M.p. 65° . B.p. $251^\circ/210-15^\circ/190\text{ mm.}$, $143-6^\circ/20\text{ mm.}$ D_4^{25} 1.1287. n_D^{25} 1.5425. Sol. H_2O , EtOH , Et_2O . Spar. sol. ligroin. Sublimes. Reduces NH_3 , AgNO_3 and Fehling's. $\text{FeCl}_3 \rightarrow$ green col. Alk. sol. turns red in air.

3-Me ether: see Creosol.

4-Me ether: isocreosol, 4-methylguaiacol, 3-hydroxy-4-methoxytoluene. $\text{C}_9\text{H}_{10}\text{O}_2$. MW, 138. Leaflets. M.p. $37-9^\circ$. B.p. 223° . D_4^{25} 1.0742. n_D^{25} 1.5269. Sublimes. Volatile in steam. Picrate: m.p. 88° .

Di-Me ether: see Homoveratrol.

3-Et ether: 4-hydroxy-3-ethoxytoluene, 2-hydroxy-5-methylphenetole. $\text{C}_9\text{H}_{12}\text{O}_2$. MW, 152. M.p. 58° .

Di-Et ether: 3:4-diethoxytoluene. $\text{C}_{11}\text{H}_{16}\text{O}_2$. MW, 180. B.p. $227-30^\circ$, $123^\circ/70\text{ mm.}$ D_4^{25} 1.0303.

3-Me-4-Et ether: 3-methoxy-4-ethoxytoluene. $\text{C}_{10}\text{H}_{14}\text{O}_2$. MW, 166. B.p. 223° . D_4^{25} 1.032.

Diacetyl: b.p. $260-4^\circ$, $160^\circ/70\text{ mm.}$

Pauly, *Ber.*, 1909, **42**, 421.

De Vries, *Rec. trav. chim.*, 1909, **28**, 278.

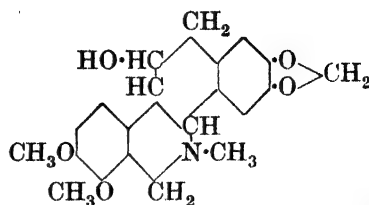
Perkin, *J. Chem. Soc.*, 1896, **69**, 1185.

Cousin, *Compt. rend.*, 1893, **116**, 105.

Homocerebron.

See Kerasin.

α-Homochelidonine



$\text{C}_{21}\text{H}_{23}\text{O}_5\text{N}$

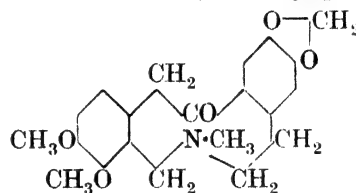
MW, 369

Alkaloid from *Chelidonium majus*. Prisms from AcOEt . M.p. 182° . Sol. EtOH , CHCl_3 . Spar. sol. Et_2O .

Schmidt, Selle, *Arch. Pharm.*, 1890, **228**, 441.

Späth, Kuffner, *Ber.*, 1931, **64**, 1123.

β-Homochelidonine (α-Allocryptopine)



$\text{C}_{21}\text{H}_{23}\text{O}_5\text{N}$

MW, 369

Occurs with other chelidonines in *Sanguinaria canadensis*, *Eschscholtzia californica*, etc. Prisms from AcOEt . M.p. $159-60^\circ$. Sol. AcOEt , CHCl_3 . Spar. sol. EtOH , Et_2O . Sol. conc. H_2SO_4 to carmine sol. $\text{POCl}_3 \rightarrow$ dihydroanhydroberberine methochloride, m.p. $200-1^\circ$.

B, HCl : m.p. 190° .

B, HAuCl_4 : m.p. $190-2^\circ$.

Methosulphate, $3\text{H}_2\text{O}$: m.p. 125° .

α -Methiodide: m.p. 185° .

β -Methiodide: m.p. 211° .

Haworth, Perkin, *J. Chem. Soc.*, 1926, **445**.

Gadamer, *Arch. Pharm.*, 1920, **258**, 156.

Fischer, *Arch. Pharm.*, 1901, **239**, 409.

Momoya, *Chem. Abstracts*, 1919, **13**, 1459.

γ-Homochelidonine (β-Allocryptopine).

Alkaloid constituent of *Sanguinaria canadensis*. Tablets from AcOEt . M.p. 168° ($170-1^\circ$). Sol. CHCl_3 . Spar. sol. cold EtOH , Et_2O . Physical isomer of β -homochelidonine.

$B, \text{HCl}, 1\frac{1}{2}\text{H}_2\text{O}$: m.p. 175° decomp.

$B, \text{HAuPtCl}_4$: m.p. 187° .

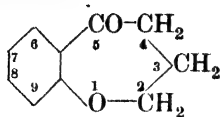
Miller, *J. Am. Pharm. Assocn.*, 1929, **18**, 12.

Konig, Tietz, *Arch. Pharm.*, 1893, **231**, 161.

Jowett, Pyman, *J. Chem. Soc.*, 1913, **103**, 299.

See also third reference above.

5-Homochromanone

 $C_{10}H_{10}O_2$

MW, 162

Oil. Sol. EtOH, Et₂O, C₆H₆, pet. ether. Warm conc. H₂SO₄ → red col.

Oxime: white plates from pet. ether. M.p. 99°.

Semicarbazone: needles from EtOH. M.p. 228-9°.

Powell, Anderson, *J. Am. Chem. Soc.*, 1931, 53, 811.

Homocinchonidine

 $C_{19}H_{22}ON_2$

MW, 294

One of the cinchona alkaloids. Prisms from EtOH. M.p. 207.5°. $[\alpha]_D - 107.3^\circ$ in EtOH. Sol. EtOH, CHCl₃. Spar. sol. Et₂O. Insol. H₂O. Similar in properties to cinchonine. Recryst. of neutral sulphate → cinchonidine sulphate. Ox. → cinchonetidine, m.p. 256°.

Acetyl: $[\alpha]_D - 34^\circ$ in EtOH.

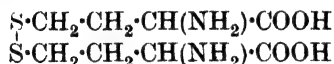
B.HCl.2H₂O: $[\alpha]_D - 138^\circ$ in EtOH.

B₂.H₂SO₄.6H₂O: $[\alpha]_D - 138^\circ$ in EtOH.

Hesse, *Ann.*, 1880, 205, 203; *Ber.*, 1881, 14, 1891.

Homococaine. See under Ecgonine.

Homocystine (Di-[3-amino-3-carboxy]-propyl disulphide)

 $C_8H_{16}O_4N_2S_2$

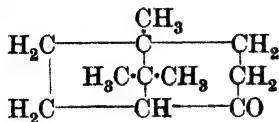
MW, 268

Plates from H₂O. M.p. 260-5° decomp. Can replace cystine as growth promoter.

Butz, du Vigneaud, *J. Biol. Chem.*, 1932, 99, 135.

du Vigneaud, Dyer, Harmon, *J. Biol. Chem.*, 1932, 101, 719.

Homoepicamphor (β-Homocamphor, 1:8:8-trimethylbicyclo-[1, 2, 3]-octanone-3)

 $C_{11}H_{18}O$

MW, 166

M.p. 202-4°. $[\alpha]_D^{15} + 13^\circ$ in MeOH. Sol. most org. solvents. Volatile in steam.

Semicarbazone: m.p. 245-7°.

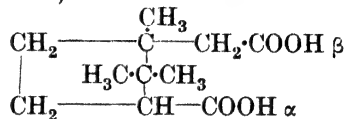
Dist. of Org. Comp.—II.

Oxime: m.p. 105°.

Isonitroso deriv.: m.p. 174-5°. $[\alpha]_D^{22} + 175.6^\circ$ in MeOH.

Salmon-Legagneur, *Compt. rend.*, 1932, 194, 467; *Bull. soc. chim.*, 1932, 51, 807.

Homoepicamphoric Acid (1:2:2-Tri-methyl-3-carboxycyclopentylacetic acid, β-homocamphoric acid)

 $C_{11}H_{18}O_4$

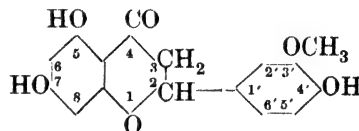
MW, 214

M.p. 220-2°. $[\alpha]_D^{18} + 27.2^\circ$ in MeOH.

β-Mononitrile: $C_{11}H_{17}O_2N$. MW, 195. M.p. 155-6°. $[\alpha]_D^{20} + 40.1^\circ$ in MeOH.

See above references.

Homoeriodictyol (Eriodictyonone, 5:7:4'-trihydroxy-3'-methoxyflavanone)

 $C_{16}H_{14}O_6$

MW, 302

Occurs in leaves of *Eriodictyon glutinosum*, Benth. Needles from AcOH. M.p. 224-5°. $[\alpha]_D^{20} - 28.21^\circ$ in EtOH. Mod. sol. EtOH, AcOH. Spar. sol. AcOEt. Insol. H₂O, CHCl₃, C₆H₆. FeCl₃ → red col. Reduces Fehling's.

7:4'-Di-Me ether: $C_{18}H_{18}O_6$. MW, 330. Needles. M.p. 136°.

Oxime: leaflets from EtOH. M.p. 224°.

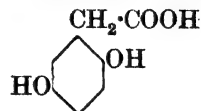
Phenylhydrazone: yellow cryst. from EtOH. M.p. 184-6°.

Shinoda, Sato, *Chem. Abstracts*, 1929, 23, 4210.

Mossler, *Ann.*, 1907, 351, 233.

Power, Tutin, *J. Chem. Soc.*, 1907, 91, 887.

Homogentisic Acid (2:5-Dihydroxyphenyl-acetic acid, 2:5-dihydroxy-α-toluic acid)

 $C_8H_8O_4$

MW, 168

Occurs in plants, and urine of alcaptonurics. Prisms + 1H₂O from H₂O. Plates from EtOH-CHCl₃. M.p. anhyd. 152-4° (146.5-147°). Sol.

H₂O, EtOH, Et₂O. Insol. CHCl₃, C₆H₆. Reduces Fehling's. KOH fusion → hydroquinone. Ox. → *p*-benzoquinonylacetic acid.

Me ester: di-Me ether, C₁₁H₁₄O₄. MW, 210. M.p. 45°. Dibenzoyl: m.p. 125°.

Et ester: C₁₀H₁₂O₄. MW, 196. M.p. 119–20°. Dibenzoyl: m.p. 130–1°.

Amide: dibenzoyl, m.p. 204°.

Di-Me ether: C₁₀H₁₂O₄. MW, 196. M.p. 124–5°.

Dibenzoyl: m.p. 181°.

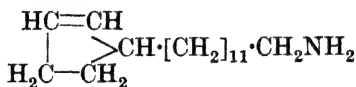
Wolkow, Baumann, *Z. physiol. Chem.*, 1888, 15, 282.

Blix, *Z. physiol. Chem.*, 1932, 210, 87.

Hahn, Stenner, *Z. physiol. Chem.*, 1929, 181, 100.

Mörner, *Z. physiol. Chem.*, 1921, 117, 85.

Homohydnocarpylamine (ω -Cyclopentenyl-dodecylamine, ω -aminododecylcyclopentene)



C₁₇H₃₃N

MW, 251

Cryst. from EtOH. M.p. 18°. B.p. 190°/15 mm.

B,HCl: m.p. 151° (160°).

N-Acetyl: m.p. 60°.

Picrate: m.p. 112°.

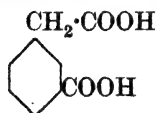
Naegeli, Stefanovitsch, *Helv. Chim. Acta*, 1928, 11, 648.

Naegeli, Vogt-Markus, *Helv. Chim. Acta*, 1932, 15, 67.

Homohydroquinone.

See Toluhydroquinone.

Homoisophthalic Acid (*m*-Carboxyphenylacetic acid, 3-carboxy- α -toluic acid)



C₉H₈O₄

MW, 180

Needles or plates from H₂O. M.p. 184–5°. Sol. hot H₂O, EtOH, Et₂O. Spar. sol. cold H₂O, C₆H₆, CHCl₃. Sublimes. Ox. → isophthalic acid.

Di-nitrile: see *m*-Cyanobenzyl cyanide.

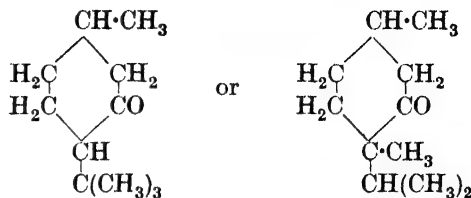
Reinglass, *Ber.*, 1891, 24, 2417.

Komppa, Hirn, *Ber.*, 1903, 36, 3611.

Homolevulinic Acid.

See 3-Keto-*n*-caproic Acid.

Homomenthone (1-Methyl-4-tert.-butylcyclohexanone-3, 1:4-dimethyl-4-isopropylcyclohexanone-3, 4(or 8)-methylmenthone)



C₁₁H₂₀O

MW, 168

B.p. 93°/11 mm. D₄²⁰ 0.9050. n_D²⁰ 1.4642. [α]_D²⁰ + 43.98.

Semicarbazone: m.p. 186°.

Rupe, Schobel, Abegg, *Ber.*, 1912, 45, 1539.

Homomestiones.

The above trivial name has been given to a number of unsaturated ketones which are here grouped together.

1. 3-Methyl-3-heptenone-5, 5-keto-3-methylheptene-3.

$$\text{CH}_3\cdot\text{CH}_2\cdot\text{CO}\cdot\text{CH}\cdot\overset{\text{CH}_3}{\underset{|}{\text{C}}}\cdot\text{CH}_2\cdot\text{CH}_3$$
 C₈H₁₄O MW, 126

B.p. 66°/18 mm., 53–4°/8 mm. D₄^{21.5} 0.85516. n_D^{21.5} 1.45073.

Semicarbazone: m.p. 162°.

2. 3-Methyl-2-heptenone-5, 5-keto-3-methylheptene-2.

$$\text{CH}_3\cdot\text{CH}_2\cdot\text{CO}\cdot\text{CH}_2\cdot\overset{\text{CH}_3}{\underset{|}{\text{C}}}\cdot\text{CH}\cdot\text{CH}_3$$
 C₈H₁₄O MW, 126

B.p. 63°/19 mm. D₄^{21.2} 0.85244. n_D^{21.2} 1.43668.

Semicarbazone: m.p. 134°.

3. 3:4-Dimethyl-3-hexenone-2, 1:2-dimethyl-1-acetobutylene-1, 3-methyl-2-acetopentene-2, 2-keto-3:4-dimethylhexene-3.

$$\text{CH}_3\cdot\text{CH}_2\cdot\overset{\text{CH}_3}{\underset{|}{\text{C}}}=\overset{\text{CH}_3}{\underset{|}{\text{C}}}\cdot\text{CO}\cdot\text{CH}_3$$
 C₈H₁₄O MW, 126

B.p. 65°/20 mm. D₄^{21.4} 0.86856. n_D^{21.4} 1.45283.

Semicarbazone: m.p. 180–2°.

4. 3:4-Dimethyl-2-hexenone-5, 1:2-dimethyl-1-acetobutylene-2, 3-methyl-4-acetopentene-2, 5-keto-3:4-dimethylhexene-2.

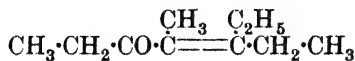
$$\text{CH}_3\cdot\text{CO}\cdot\overset{\text{CH}_3}{\underset{|}{\text{C}}}-\overset{\text{CH}_3}{\underset{|}{\text{C}}}\cdot\text{CH}\cdot\text{CH}_3$$
 C₈H₁₄O MW, 126

B.p. 154°/750 mm., 48°/12 mm. D₄^{19.3} 0.85385. n_D^{19.3} 1.43768.

Semicarbazone: two forms, m.p.'s. 163° and 203-4°.

Abbot, Kon, Satchell, *J. Chem. Soc.*, 1928, 2519 *et seq.*

5. 4-Methyl-3-ethyl-3-heptenone-5, 5-keto-4-methyl-3-ethylheptene-3.

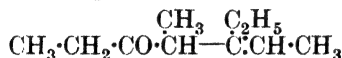


$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 80°/10 mm. D_4^{19} 0.86218. n_D^{19} 1.45453.

Semicarbazone: m.p. 153°.

6. 4-Methyl-3-ethyl-2-heptenone-5, 5-keto-4-methyl-3-ethylheptene-2.

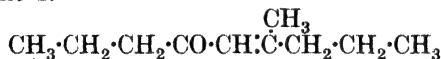


$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 74°/10 mm. D_4^{21} 0.85640. n_D^{21} 1.44522.

Semicarbazone: m.p. 109°.

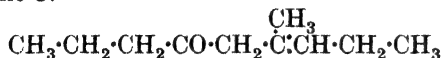
7. 4-Methyl-4-nonenone-6, 6-keto-4-methylnonene-4.



$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 90-2°/16 mm. D_4^{20} 0.8608. n_D^{20} 1.45183.

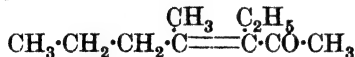
8. 4-Methyl-3-nonenone-6, 6-keto-4-methylnonene-3.



$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 94°/18 mm. $D_4^{21.6}$ 0.84130. $n_D^{21.5}$ 1.44291.

9. 4-Methyl-3-ethyl-3-heptenone-2, 4-methyl-3-acetoheptene-3, 2-keto-4-methyl-3-ethylheptene-3.

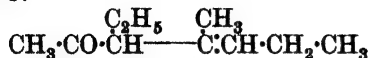


$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 83°/14 mm. D_4^{20} 0.85589. n_D^{20} 1.45353.

Semicarbazone: m.p. 123°.

10. 4-Methyl-5-ethyl-3-heptenone-6, 4-methyl-5-acetoheptene-3, 6-keto-4-methyl-5-ethylheptene-3.



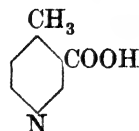
$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 69°/11 mm. D_4^{20} 0.84503. n_D^{20} 1.44050.

Semicarbazone: m.p. 154°.

Kon, Leton, *J. Chem. Soc.*, 1931, 2502 *et seq.*

Homonicotinic Acid (4-Methylpyridine-3-carboxylic acid, 4-methylnicotinic acid, γ -picoline-3-carboxylic acid)



$\text{C}_7\text{H}_7\text{O}_2\text{N}$

MW, 137

Prisms from H_2O . M.p. 215-16° decomp. Hot $\text{Ca}(\text{OH})_2 \rightarrow \gamma$ -picoline. Hot $\text{H} \cdot \text{CHO} \rightarrow$ trimethylolhomonicotinic lactone.

Et ester: $\text{C}_9\text{H}_{11}\text{O}_2\text{N}$. MW, 165. B.p. 118°/12 mm. *Picrate*: m.p. 137°. *Chloroplatinate*: m.p. 183° decomp.

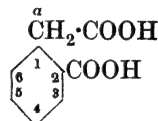
Chloride: $\text{C}_7\text{H}_6\text{ONCl}$. MW, 155.5. B.p. 105°/12 mm. *Chloroplatinate*: m.p. 206-7° decomp.

B,HAuCl_4: decomp. 190° (sinters at 180°).

Gabriel, Colman, *Ber.*, 1902, 35, 2849.

Rabe, Jantzen, *Ber.*, 1921, 54, 925.

Homophthalic Acid (o-Carboxy- α -toluic acid, o-carboxyphenylacetic acid)



$\text{C}_9\text{H}_8\text{O}_4$

MW, 180

M.p. 180-1°. Sol. EtOH, hot H_2O . Spar. sol. Et_2O . Insol. CHCl_3 , C_6H_6 . k (first) = 1.91×10^{-6} at 25°: (second) = 0.9×10^{-6} at 25°. Ox. \rightarrow phthalic acid.

2-Me ester: $\text{C}_{10}\text{H}_{10}\text{O}_4$. MW, 194. M.p. 143-5°. $k = 4.34 \times 10^{-6}$ at 25°. *Amide*: $\text{C}_{10}\text{H}_{11}\text{O}_3\text{N}$. MW, 193. M.p. 110-12°.

α -*Me ester*: m.p. 96-8°. $k = 7.64 \times 10^{-5}$ at 25°.

2-Et ester: $\text{C}_{11}\text{H}_{12}\text{O}_4$. MW, 208. M.p. 111-13°. $k = 4.6 \times 10^{-5}$ at 25°.

α -*Et ester*: m.p. 107-8°. $k = 7.08 \times 10^{-5}$ at 25°.

Di-Me ester: $\text{C}_{11}\text{H}_{12}\text{O}_4$. MW, 208. M.p. 39-42°. B.p. 169-74°/15 mm.

Di-Et ester: $\text{C}_{13}\text{H}_{16}\text{O}_4$. MW, 236. B.p. 291.5-292.5°.

Anhydride: $\text{C}_9\text{H}_6\text{O}_3$. MW, 162. M.p. 140-5-141°.

2-Amide: $\text{C}_9\text{H}_9\text{O}_3\text{N}$. MW, 179. M.p. 230° decomp. $k = 5.0 \times 10^{-5}$ at 25°.

α -*Amide*: m.p. 185-7° (184°). $k = 8.9 \times 10^{-5}$ at 25°.

α -*Nitrile*: o-carboxybenzyl cyanide. $\text{C}_9\text{H}_7\text{O}_2\text{N}$. MW, 161. M.p. 116° decomp.

Dinitrile : see *o*-Cyanobenzyl cyanide.

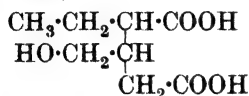
Imide : $C_8H_7O_2N$. MW, 161. M.p. 233°.

Anilide : m.p. 231.5°.

Davies, Poole, *J. Chem. Soc.*, 1928, 1616.

Dieckmann, Hardt, *Ber.*, 1919, 52, 1141.

Homopilomalic Acid (2-Hydroxymethylpentane-1 : 3-dicarboxylic acid, 2-hydroxymethyl-1-ethylglutaric acid)



$C_8H_{14}O_5$

MW, 190

Free acid unstable.

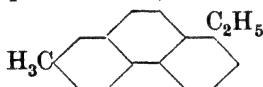
Di-Ester : $C_{12}H_{22}O_5$. MW, 246. B.p. 293°/755 mm., 181–3°/26 mm.

Diamide : $C_8H_{16}O_3N_2$. MW, 188. Prisms from H_2O . M.p. 208° (206°). Sol. H_2O , EtOH. $[\alpha]_D^{25} + 20.8^\circ$ in EtOH.Aq.

Jowett, *J. Chem. Soc.*, 1901, 79, 1338.

Pinner, Schwarz, *Ber.*, 1902, 35, 198.

Homopimanthrene (Methylpimanthrene, 7-methyl-1-ethylphenanthrene)



$C_{17}H_{16}$

MW, 220

Plates from EtOH. M.p. 81°.

Picrate : yellow needles from MeOH. M.p. 115–16°.

Quinoxaline deriv. : needles from AcOH. M.p. 154°.

Ruzicka, Balas, *Helv. Chim. Acta*, 1924, 7, 875.

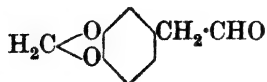
Ruzicka, de Graaf, Müller, *Helv. Chim. Acta*, 1932, 15, 1300.

Haworth, *J. Chem. Soc.*, 1932, 2718.

Homopiperidinic Acid.

See 4-Amino-*n*-valeric Acid.

Homopiperonal (3 : 4-Methylenedioxyphenylacetaldehyde, 3 : 4-methylenedioxy- α -toluic aldehyde)



$C_9H_8O_3$

MW, 164

Cryst. from MeOH. M.p. 69°. B.p. 143–4°/10 mm., 123–5°/1 mm. $D_{20} 1.295$. $n_D 1.57117$.

Oxime : needles from EtOH.Aq. M.p. 121° (124–5°). B.p. 180–1°/10 mm.

Semicarbazone : cryst. from MeOH. M.p. 189°.

2 : 4-Dinitrophenylhydrazone : orange leaflets from AcOH. M.p. 140–1°.

Semmler, Bartelt, *Ber.*, 1908, 41, 2751.

Erdtman, Robinson, *J. Chem. Soc.*, 1933, 1530.

Homopiperonyl Alcohol (2-[3 : 4-Methylenedioxyphenyl]-ethyl alcohol)



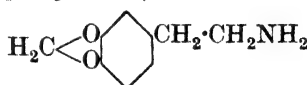
$C_9H_{10}O_3$

MW, 166

B.p. 156°/10 mm. $n_D 1.54780$.

Semmler, Bartelt, *Ber.*, 1908, 41, 2752.

Homopiperonylamine (2-[3 : 4-Methylenedioxyphenyl]-ethylamine)



$C_9H_{11}O_2N$

MW, 165

B.p. 166°/20 mm., 146–8°/10 mm. $D^{20} 1.225$. $n_D 1.5620$.

B.HCl : m.p. 208–9° (210–11°).

Picrate : m.p. 160° decomp.

Kindler, Peschke, *Arch. Pharm.*, 1931, 269, 70.

See also above reference.

Homopiperonylic Acid (3 : 4-Methylenedioxyphenylacetic acid, homoprotocatechuic acid methylene ether)



$C_9H_8O_4$

MW, 180

Cryst. from H_2O . M.p. 127°.

Me ester : $C_{10}H_{10}O_4$. MW, 194. B.p. 153–5°/10 mm. $D^{20} 1.246$. $n_D 1.534$.

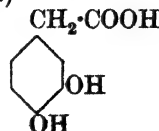
Nitrile : $C_9H_7O_2N$. MW, 161. B.p. 153–6°/10 mm. $D_{20} 1.231$. $n_D 1.53698$.

Semmler, Bartelt, *Ber.*, 1908, 41, 2752.

Stevens, *J. prakt. Chem.*, 1934, 140, 46.

Slotta, Haberland, *J. prakt. Chem.*, 1934, 139, 211.

Homoprotocatechuic Acid (3 : 4-Dihydroxyphenylacetic acid)



$C_8H_8O_4$

MW, 168

Needles from C_6H_6 . M.p. 127°. Sol. H_2O , EtOH, Et₂O. Insol. pet. ether. Reduces

NH_3 , AgNO_3 and Fehling's. $\text{FeCl}_3 \rightarrow$ green col.
 KOH fusion \rightarrow protocatechuic acid.

3-Me ether : see Homovanillic Acid.

3 : 4-Di-Me ether : see Homoveratric Acid.

Methylene ether : see Homopiperonylic Acid.

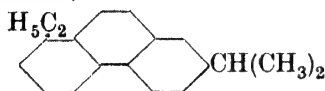
3 : 4-Diacetyl : cryst. from EtOH.Aq. M.p. 89–90°. Sol. EtOH , Et_2O . Spar. sol. H_2O .

Pictet, Gams, *Ber.*, 1909, **42**, 2949.

Homopyrrole.

See Methylpyrrole.

Homoretene (Methylretene, 8-ethyl-2-isopropylphenanthrene)



$\text{C}_{19}\text{H}_{20}$ MW, 248

Plates from EtOH . M.p. 79°.

Quinoxaline deriv. : yellow needles from AcOH . M.p. 165–6°.

Picrate : yellow ppt. from EtOH . M.p. 101–4°.

Ruzicka, Meyer, *Helv. Chim. Acta*, 1922, **5**, 590.

Ruzicka, de Graaf, Müller, *Helv. Chim. Acta*, 1932, **15**, 1300.

Haworth, *J. Chem. Soc.*, 1932, 2719.

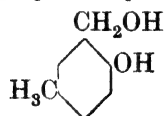
Homosalicylaldehyde.

See Hydroxytoluic Aldehyde and o-Hydroxyphenylacetaldehyde.

Homosalicylic Acid.

See Hydroxytoluic Acid.

Homosaligenin (5-Methylsaligenin, 5-methyl-2-hydroxybenzyl alcohol, 2-hydroxy-5-methylbenzyl alcohol, 3- ω -hydroxy-m-4-xyleneol)

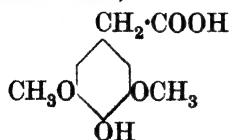


$\text{C}_8\text{H}_{10}\text{O}_2$ MW, 138

Plates from H_2O . M.p. 105°. Very sol. EtOH , Et_2O , hot H_2O . Sol. 15 parts H_2O at ord. temp.

Auwers, *Ber.*, 1907, **40**, 2531.

Homosyringic Acid (4-Hydroxy-3 : 5-dimethoxyphenylacetic acid)



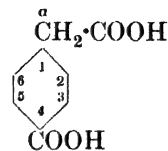
$\text{C}_{10}\text{H}_{12}\text{O}_5$ MW, 212

Needles from ligroin. M.p. 130–1°. Sol. C_6H_6 . Insol. pet. ether. $\text{FeCl}_3 \rightarrow$ red col.

Benzoyl : needles from C_6H_6 . M.p. 149–50°.

Mauthner, *J. prakt. Chem.*, 1935, **142**, 32.

Homoterephthalic Acid (p-Carboxyphenylacetic acid)



$\text{C}_9\text{H}_8\text{O}_4$ MW, 180

Cryst. from EtOH.Aq. M.p. 237–8°. Sol. Et_2O , C_6H_6 . Sol. 100 parts H_2O at 50°, 7 parts EtOH at 30°.

Di-Et ester : $\text{C}_{13}\text{H}_{16}\text{O}_4$. MW, 236. B.p. 312–13°.

4-Amide : $\text{C}_9\text{H}_9\text{O}_3\text{N}$. MW, 179. M.p. 229°.

α -Amide : cryst. from EtOH . M.p. 261°.

Diamide : $\text{C}_9\text{H}_{10}\text{O}_2\text{N}_2$. MW, 178. M.p. 235°.

4-Nitrile : p-cyanophenylacetic acid. $\text{C}_9\text{H}_7\text{O}_2\text{N}$. MW, 161. Cryst. from EtOH . M.p. 152°.

α -Nitrile : cryst. from EtOH.Aq. M.p. 201°.

Dinitrile : see p-Cyanobenzyl cyanide.

α -Amide-4-nitrile : $\text{C}_9\text{H}_8\text{ON}_2$. MW, 160. Cryst. from EtOH.Aq. M.p. 195.5° (196°).

4-Amide- α -nitrile : plates from EtOH . M.p. 182°.

Mellinghoff, *Ber.*, 1889, **22**, 3211.

Fileti, Basso, *Gazz. chim. ital.*, 1895, **21**, 61.

Fileti, Baldracco, *J. prakt. Chem.*, 1893, **47**, 532.

Homoterpenylic Acid



$\text{C}_9\text{H}_{14}\text{O}_4$ MW, 186

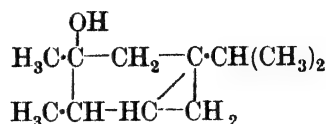
Plates from H_2O . M.p. 100–1° (100–102.5° from Et_2O). Very sol. H_2O , CHCl_3 . Spar. sol. Et_2O .

Et ester : $\text{C}_{11}\text{H}_{18}\text{O}_4$. MW, 214. B.p. 186°/18 mm. Liq. at –15°.

Baeyer, Villiger, *Ber.*, 1896, **29**, 1928.

Simonsen, *J. Chem. Soc.*, 1907, **91**, 190.

Homothujyl Alcohol



$\text{C}_{11}\text{H}_{20}\text{O}$ MW, 168

Exists in two forms.

(i) *Solid form.*

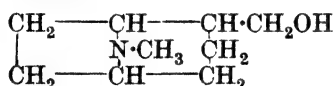
Needles from MeOH. M.p. 84°. $[\alpha]_D^{15} - 30.5^\circ$ in Et₂O, $[\alpha]_D^{15} - 26.0^\circ$ in MeOH. Does not react with phenyl isocyanate.

(ii) *Liquid form.*

B.p. 204°. $[\alpha]_D^{14} + 35.9^\circ$ in Et₂O, $[\alpha]_D^{15} + 33.4^\circ$ in MeOH. Does not react with phenyl isocyanate.

Wallach, *Ann.*, 1908, **360**, 93.

Thomson, *J. Chem. Soc.*, 1910, **97**, 1509.

Homotropine

C₉H₁₇ON

MW, 155

Needles from ligroin. M.p. 85°. Sol. H₂O, EtOH, Et₂O. Spar. sol. pet. ether. $[\alpha]_D^{20} + 22.48^\circ$ in EtOH. Mydriatic and local anæsthetic.

B.HCl: cryst. from EtOH-Et₂O. M.p. 192°.

B.HAuCl₄: cryst. M.p. 191°.

Picrate: needles from EtOH. M.p. 208-9°.

Methiodide: cryst. from EtOH. Does not melt below 300°. *B.H₂PtCl₆*: red cryst. M.p. 183°. *B.HAuCl₄*: yellow leaflets. M.p. 238°.

Benzoyl deriv.: *picrate*, yellow cryst. M.p. 177°.

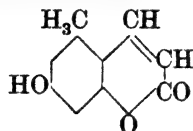
Tropic ester: see Mydriasin.

v. Braun, Müller, *Ber.*, 1918, **51**, 239.

Homotropinic Acid.

See Granatic Acid.

Homoumbelliferone (7-Hydroxy-5-methylcoumarin, 5-methylumbelliferone)



C₁₀H₈O₃

MW, 176

Yellow plates from Me₂CO. M.p. 248°. Sol. EtOH, Me₂CO, AcOH. Insol. H₂O, CHCl₃, C₆H₆. Sol. alkalis and conc. H₂SO₄ with blue fluor.

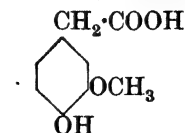
Acetyl: needles from H₂O. M.p. 126°. Sol. EtOH, Et₂O. KOH → blue fluor.

Me ether: C₁₁H₁₀O₃. MW, 190. Needles from EtOH.Aq. M.p. 146°. Sol. C₆H₆, CHCl₃. Spar. sol. EtOH, Et₂O. Conc. H₂SO₄ → blue fluor.

v. Pechmann, Welsh, *Ber.*, 1884, **17**, 1649.

Hoesch, *Ber.*, 1913, **46**, 890.

Homovanillic Acid (*Homoprotocatechuic acid* 3-methyl ether, 4-hydroxy-3-methoxyphenylacetic acid, 4-hydroxy-3-methoxy- α -toluic acid)



C₉H₁₀O₄

MW, 182

Prisms from H₂O or C₆H₆. M.p. 142° (139°). Sol. hot H₂O, EtOH, Et₂O. Spar. sol. cold C₆H₆. FeCl₃ → faint green col. Dist. Ca salt with Ca(OH)₂ → creosol. Hot dil. HCl → homoprotocatechuic acid + CH₃Cl.

Et ester: C₁₁H₁₄O₄. MW, 210. B.p. 180-5° 13-15 mm.

4-Acetyl: m.p. 140° (134°).

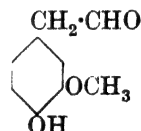
4-Carbomethoxyl: m.p. 140-1°.

Tiemann, Nagai, *Ber.*, 1877, **10**, 202, 204.

Mauthner, *Ann.*, 1909, **370**, 373.

Kitasato, *Chem. Abstracts*, 1928, **22**, 1780.

Homovanillin (4-Hydroxy-3-methoxyphenylacetaldehyde)



C₉H₁₀O₃

MW, 166

Prisms from CCl₄. M.p. 50-50.5° (165°). B.p. 111-14°/0.45 mm., 105-6°/0.25 mm. Sol. H₂O, Et₂O, pet. ether. Spar. sol. EtOH. Reduces Fehling's. Resinified by acids or alkalis.

Me ether: see Homoveratric Aldehyde.

Acetyl: p-nitrophenylhydrazone, m.p. 179°.

Oxime: m.p. 115°.

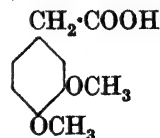
p-Nitrophenylhydrazone: m.p. 154.5°.

Semicarbazone: m.p. 173°.

Harries, Haarmann, *Ber.*, 1915, **48**, 39.

Harries, *Ber.*, 1915, **48**, 868.

Homoveratric Acid (*Homoveratrumic acid*, 3:4-dimethoxy- α -toluic acid, 3:4-dimethoxyphenylacetic acid, homoprotocatechuic acid dimethyl ether)



C₁₀H₁₂O₄

MW, 196

Needles + 1H₂O from H₂O. Cryst. anhyd. from C₆H₆-pet. ether. M.p. 82° (80°), anhyd. 98-9°. Sol. H₂O, EtOH, Et₂O.

Et ester: $C_{12}H_{16}O_4$. MW, 224. B.p. $191^\circ/25$ mm.

Chloride: $C_{10}H_{11}O_3Cl$. MW, 214.5. B.p. approx. $240^\circ/25$ mm.

Amide: $C_{10}H_{13}O_3N$. MW, 195. M.p. $145-7^\circ$.

Nitrile: $C_{10}H_{11}O_2N$. MW, 177. M.p. $64-5^\circ$. B.p. $171-8^\circ/10$ mm.

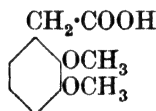
Hydrazide: m.p. $115-16^\circ$.

Pictet, Gams, *Ber.*, 1909, **42**, 2949.

Cain, Simonsen, Smith, *J. Chem. Soc.*, 1913, **103**, 1038.

Kaufmann, Müller, *Ber.*, 1918, **51**, 127.

o-Homoveratric Acid (2:3-Dimethoxy- α -toluic acid, 2:3-dimethoxyphenylacetic acid, homo-o-veratric acid)



$C_{10}H_{12}O_4$ MW, 196

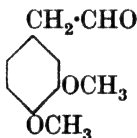
Cryst. from H_2O or pet. ether. M.p. $82-3^\circ$.

Amide: $C_{10}H_{13}O_3N$. MW, 195. M.p. $130-130.5^\circ$.

Späth, Mosettig, *Ann.*, 1923, **433**, 146.

Montequi, *Chem. Abstracts*, 1930, **24**, 605.

Homoveratric Aldehyde (Homovanillin methyl ether, 3:4-dimethoxyphenylacetaldehyde)



$C_{10}H_{12}O_3$ MW, 180

Yellow oil. B.p. $121^\circ/0.35$ mm. D_{20}^{20} 1.55. n_D^{20} 1.5426. Spar. sol. H_2O . Reduces warm Fehling's.

Oxime: m.p. $90-1^\circ$.

p-Nitrophenylhydrazone: m.p. 159° .

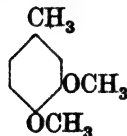
Semicarbazone: m.p. 181° .

Mannich, Jacobsohn, *Ber.*, 1910, **43**, 196.

Harries, Haarmann, *Ber.*, 1915, **48**, 41.

Harries, Adam, *Ber.*, 1916, **49**, 1030.

Homoveratrol (3:4-Dimethoxytoluene, homocatechol dimethyl ether, 4-methylveratrol, creosol 4-methyl ether)



$C_9H_{12}O_2$ MW, 152

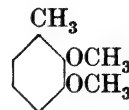
Prisms from Et_2O . M.p. 24° (21°). B.p. $219-21^\circ$ (216°), $128-30^\circ/25$ mm., $116-17^\circ/23$ mm.

Sol. $EtOH$, Et_2O . Insol. H_2O , dil. $EtOH$. D_4^{25} 1.0653, D_{18}^{25} 1.0562 (1.0491). n_D^{25} 1.5257. Ox. \rightarrow veratric acid.

De Vries, *Rec. trav. chim.*, 1909, **28**, 292.

Luff, Perkin, Robinson, *J. Chem. Soc.*, 1910, **97**, 1134.

o-Homoveratrol (2:3-Dimethoxytoluene, 3-methylveratrol)



$C_9H_{12}O_2$ MW, 152

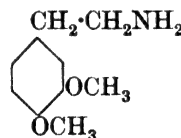
Oil. B.p. $92-3^\circ/18$ mm. Conc. $H_2SO_4 \rightarrow$ pink col. on standing.

Mosimann, Tambor, *Ber.*, 1916, **49**, 1262.

Homoveratricumic Acid.

See Homoveratric Acid.

Homoveratrylamine (3:4-Dimethoxyphenylethylamine, 4-[β -aminoethyl]-veratrol)



$C_{10}H_{15}O_2N$ MW, 181

M.p. 124° . B.p. $188^\circ/15$ mm. Sol. H_2O , $EtOH$. Insol. Me_2CO . Conc. HCl at $150^\circ \rightarrow$ 3:4-dihydroxyphenylethylamine.

B, HCl : m.p. $154-5^\circ$.

B_2, H_2PtCl_6 : m.p. 196° (174°).

N-Formyl: m.p. $40-2^\circ$. B.p. $170^\circ/0.01$ mm.

N-Homoveratroyl: needles from dil. $AcOH$ or $CHCl_3$ -pet. ether. M.p. 124° . Sol. hot H_2O , $CHCl_3$, $AcOH$. Insol. pet. ether. Sol. conc. HCl , pptd. unchanged by H_2O .

N-Trimethylhomogalloyl: m.p. 98° .

N-Homopiperonyl: m.p. 136° .

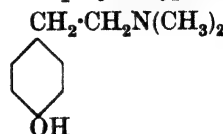
N-4-Methoxybenzyl: m.p. $123-5^\circ$.

Späth, Polgar, *Monatsh.*, 1929, **51**, 190.

Kindler, D.R.P., 571,794, (*Chem. Abstracts*, 1933, **27**, 4246).

Mannich, Jacobsohn, *Ber.*, 1910, **43**, 196.

Hordenine (Anhaline, p - β -dimethylaminoethylphenol, dimethyl- p -hydroxyphenylethylamine, 1-dimethylamino-2- p -hydroxyphenylethane)



$C_{10}H_{16}ON$

MW, 165

Alkaloid of barley germs and Mexican *Anhalonium Fissuratum*. Prisms. M.p. 117°. B.p. 173-4°/11 mm. Sublimes at 140-50°. Sol. hot H₂O, EtOH, Et₂O, CHCl₃. Spar. sol. C₆H₆. Reduces acid KMnO₄ and NH₃.AgNO₃.

B₂H₂SO₄: m.p. anhyd. 205° (209-11°).

B.HCl: m.p. 176-7°.

Benzoyl deriv.: m.p. 47-8°.

Picrate: m.p. 139-40°.

Methiodide: m.p. 229-30°.

Voswinckel, *Ber.*, 1912, **45**, 1004.

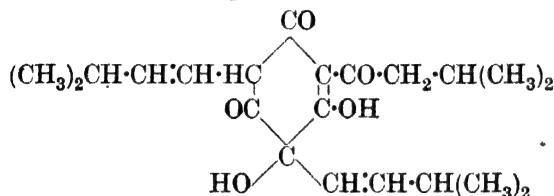
Späth, Sobel, *Monatsh.*, 1920, **41**, 77.

Späth, *Monatsh.*, 1919, **40**, 129.

Humulene.

See Caryophyllene.

Humulone (α -Lupulinic acid)



C₂₁H₃₀O₅

MW, 362

One of the bitter acids from hops. Cryst. M.p. 66-66.5°. Sol. org. solvents. Spar. sol. H₂O. [α]_D²⁰ -232.2°. Reduces NH₃.AgNO₃. Alc. FeCl₃ \rightarrow reddish-violet col.

o-Phenylenediamine deriv.: cryst. from C₆H₆. M.p. 115-17°.

Wöllmer, *Ber.*, 1916, **49**, 782.

Wieland, *Ber.*, 1925, **58**, 2012.

Hydantoic Acid (*Carbamylglycine, ureidoacetic acid, glycoluric acid, N-carboxymethylurea*)



C₃H₆O₃N₂

MW, 118

Prisms. M.p. 180° (156°, 163°). Sol. hot H₂O, EtOH. Spar. sol. cold H₂O, cold EtOH, Et₂O. Heat of comb. C_p 308.4 Cal., C_v 308.9 Cal. Br \rightarrow parabanic acid. HI at 170° \rightarrow CO₂, NH₃, and glycine. Hot FeCl₃ \rightarrow red col.

Et ester: C₅H₁₀O₃N₂. MW, 146. Needles from H₂O. M.p. 135°. Insol. Et₂O.

n-Butyl ester: C₇H₁₄O₃N₂. MW, 174. M.p. 119°.

Amide: C₃H₄O₂N₃. MW, 117. Prisms from H₂O. M.p. 180° (204°).

Baeyer, *Ann.*, 1864, **130**, 160.

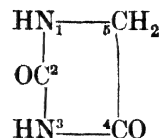
Weidel, Roithner, *Monatsh.*, 1896, **17**, 188.

Lippich, *Ber.*, 1908, **41**, 2959.

Harries, Weiss, *Ber.*, 1900, **33**, 3418.

West, *J. Biol. Chem.*, 1918, **34**, 188.

Hydantoin (*Diketotetrahydroglyoxaline, glycollylurea*)



C₃H₄O₂N₂

MW, 100

Needles from MeOH. M.p. 220° (216°). Sol. EtOH. Spar. sol. H₂O, Et₂O. Sol. alkalis. Br \rightarrow parabanic acid. H·CHO \rightarrow hydroxymethylhydantoin, m.p. 125°. Hot Ba(OH)₂ \rightarrow hydantoic acid.

1-Acetyl: m.p. 143-4°.

1:3-Diacetyl: m.p. 104-5°.

3-Benzylidene: C₁₀H₈O₂N₂. MW, 188. Yellow needles from EtOH. M.p. 220°.

Pauly, Sauter, *Ber.*, 1930, **63**, 2068.

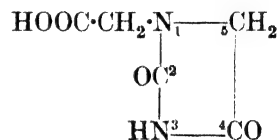
Harries, Weiss, *Ber.*, 1900, **33**, 3419.

Johnson, Bengis, *J. Am. Chem. Soc.*, 1913, **35**, 1605.

Diels, Heintzel, *Ber.*, 1905, **38**, 305.

Anschütz, *Ann.*, 1889, **254**, 260.

1-Hydantoinacetic Acid (*1-Carboxymethylhydantoin*)



C₅H₆O₄N₂

MW, 158

Cryst. from H₂O.

Me ester: C₆H₈O₄N₂. MW, 172. Cryst. from C₆H₆. M.p. 114° (107-8°).

Et ester: C₇H₁₀O₄N₂. MW, 186. Needles from C₆H₆. M.p. 84-5°.

Amide: C₅H₇O₃N₃. MW, 157. Plates from H₂O. M.p. 196-7°.

Jongkees, *Rec. trav. chim.*, 1908, **27**, 324.

Bailey, Snyder, *J. Am. Chem. Soc.*, 1915, **37**, 935, 945.

3-Hydantoinacetic Acid (*3-Carboxymethylhydantoin*).

Cryst. from EtOH. M.p. 196°. Sol. H₂O, alkalis. Stable to acids, unstable to alkalis. NaOH \rightarrow glycylglycine-carboxylic acid.

Et ester: needles from Et₂O. M.p. 120°.

5-Benzylidene deriv., m.p. 155°.

Propyl ester: C₈H₁₂O₄N₂. MW, 200. M.p. 116°.

Isobutyl ester: C₉H₁₄O₄N₂. MW, 214. M.p. 124°.

Isoamyl ester: C₁₀H₁₆O₄N₂. MW, 228. M.p. 104°.

Amide : m.p. 226°.

Anilide : m.p. 218°.

5-Benzyl : m.p. 181-3°.

5-Benzylidene : m.p. 260°.

Gränacher, Landolt, *Helv. Chim. Acta*, 1927, **10**, 799.

Johnson, Renfrew, *J. Am. Chem. Soc.*, 1925, **47**, 240.

Cerchez, *Bull. soc. chim.*, 1931, **49**, 602.

Locquin, Cerchez, *Compt. rend.*, 1929, **188**, 177.

5-Hydantoinacetic Acid (5-Carboxymethyl-hydantoin, *malyureidic acid*).

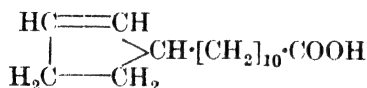
Prisms from EtOH or H₂O. M.p. 215-16° (224-6°) decomp. Spar. sol. H₂O, EtOH. Insol. EtOH.

Lippich, *Ber.*, 1908, **41**, 2972.

Gabriel, *Ann.*, 1906, **348**, 87.

Johnson, Guest, *Am. Chem. J.*, 1912, **48**, 103.

Hydnocarpic Acid (ω -Cyclopentenylundecylic acid)



C₁₆H₂₈O₂

MW, 252

Constituent of saponifiable matter of Chaulmoogra oil. Plates from EtOH. M.p. 59-60°. Spar. sol. most org. solvents. Readily sol. CHCl₃. $[\alpha]_D + 68.1^\circ$ in CHCl₃.

Me ester : C₁₇H₃₀O₂. MW, 266. M.p. 8°. B.p. 200-3°/19 mm. $[\alpha]_D + 62.4^\circ$ in CHCl₃.

Et ester : C₁₈H₃₂O₂. MW, 280. B.p. 211°/19 mm. $[\alpha]_D + 51.6^\circ$ in CHCl₃.

Amide : C₁₆H₂₉ON. MW, 251. Fine needles from EtOH. M.p. 112-13°. $[\alpha]_D + 70.2^\circ$ in CHCl₃.

dl-*Nitrile* : C₁₆H₂₇N. MW, 233. Colourless liq. B.p. 155-6°/2-3 mm. D₂₅²⁵ 0.8580. n_D²⁵ 1.4559.

Power, Barrowcliff, *J. Chem. Soc.*, 1905, **87**, 888.

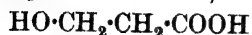
Shriner, Adams, *J. Am. Chem. Soc.*, 1925, **47**, 2727.

Hinegardner, *J. Am. Chem. Soc.*, 1933, **55**, 2831.

Hydracetine.

β -Acetylphenylhydrazine, *q.v.*

Hydracrylic Acid (2-Hydroxypropionic acid, β -lactic acid, ethylene-lactic acid)



C₃H₆O₃

MW, 90

Free acid exists as syrup. $k = 3.11 \times 10^{-3}$ at 25°. Dist. \rightarrow acrylic acid + H₂O. Salts

on heating \rightarrow diacrylic acid and paradipimelic acids. Ox. \rightarrow oxalic acid + CO₂. KOH fusion \rightarrow formic, acetic, oxalic and glycollic acids.

Na salt : m.p. 143°.

Me ether : see 2-Methoxypropionic Acid.

Et ether : 2-ethoxypropionic acid. C₅H₁₀O₃. MW, 118. B.p. 119°/19 mm. D₄¹⁶ 1.0508. $k = 3.19 \times 10^{-3}$. *Et ester* : C₇H₁₄O₃. MW, 146. B.p. 63°/13 mm., 50°/7 mm. *Amide* : C₅H₁₁O₂N. MW, 117. M.p. 50.5°. *Nitrile* : C₅H₉ON. MW, 99. B.p. 172°. D₄²⁵ 0.9189.

Phenyl ether : see 2-Phenoxypropionic Acid.

Me ester : C₄H₈O₃. MW, 104. B.p. 177-84°, 121°/94 mm., 79°/12 mm. D¹⁶ 1.105. n_D²³ 1.43.

Et ester : C₅H₁₀O₃. MW, 118. B.p. 185-90°, 81°/13 mm. D²⁰ 1.059. n_D²³ 1.4271.

Propyl ester : C₆H₁₂O₃. MW, 132. B.p. 142°/107 mm., 98°/12 mm. D²⁵ 1.4341. n_D²³ 1.4341.

Isopropyl ester : b.p. 128.5°/82 mm., 95°/12 mm. D²⁵ 1.058. n_D²³ 1.4303.

Nitrile : ethylene cyanohydrin. C₃H₅ON. MW, 71. B.p. 220°, 110°/15 mm. D° 1.059. Misc. with H₂O, EtOH. P₂O₅ \rightarrow acrylic nitrile. HCl \rightarrow NH₄Cl + hydracrylic and acrylic acids.

Acetyl : b.p. 205-8°.

Read, *Organic Syntheses*, 1927, VII, 55.

Kendall, McKenzie, *Organic Syntheses*, 1923, III, 57.

Palomaa, *Chem. Zentr.*, 1912, II, 596.

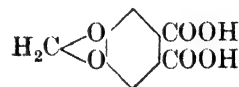
Palomaa, Kilpi, *Chem. Zentr.*, 1910, II, 1453.

Drushel, Holden, *Chem. Zentr.*, 1916, I, 142.

Hydracrylic Aldehyde.

See 2-Hydroxypropionaldehyde.

Hydrastic Acid (4:5-Methylenedioxyphthalic acid)



C₉H₆O₆

MW, 210

Prisms from H₂O. M.p. 175° decomp. (187° rapid heat.). Spar. sol. H₂O, Et₂O. Insol. CHCl₃, pet. ether.

Mono-Me ester : C₁₀H₈O₆. MW, 224. Plates from EtOH. M.p. 136°.

Di-Me ester : C₁₁H₁₀O₆. MW, 238. Leaflets from EtOH. M.p. 88-9°.

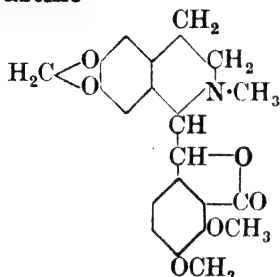
Anhydride : C₉H₄O₅. MW, 192. Needles from EtOH. M.p. 175°.

Imide : methylenedioxyphthalimide.

$C_9H_5O_4N$. MW. 191. Needles from AcOH. M.p. 275–7°.

Freund, *Ann.*, 1892, **271**, 375.
Stevens, Robertson, *J. Chem. Soc.*, 1927, 2790.

***l*-Hydrastine**



$C_{21}H_{21}O_6N$ MW, 383

Alkaloid from Golden Seal (*Hydrastis canadensis*). Prisms from EtOH. M.p. 132°. $[\alpha]_D^{20}$ –49.8° in EtOH. Bitter taste. Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. EtOH. Insol. H_2O . Sol. conc. H_2SO_4 to violet sol., conc. HNO_3 to orange sol. Sol. in dil. H_2SO_4 + $KMnO_4$ → blue fluor. HNO_3 → hydrastinine + opianic acid. Salts are unstable.

B, HCl : m.p. 116°. $[\alpha]_D + 127.3^\circ$ in dil. HCl.
Picrate: m.p. 184°.

Freund, *Ann.*, 1892, **271**, 311.
Eigkman, *Rec. trav. chim.*, 1886, **5**, 291.
Freund, Will, *Ber.*, 1887, **20**, 88.

Hydrastine a (*Synthetic hydrastine*).

Prisms from AcOEt. M.p. 137°. Sol. $CHCl_3$. Spar. sol. cold EtOH, Et_2O .
 B, HCl : m.p. 165° decomp.
Picrate: m.p. 219°.

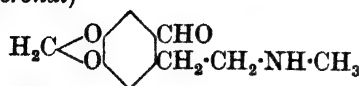
Hope, Pyman, Remfry, Robinson, *J. Chem. Soc.*, 1931, 236.
Marshall, Pyman, Robinson, *J. Chem. Soc.*, 1934, 1317.

Hydrastine b.

Prisms from EtOH. M.p. 151–2°. Synthetic hydrastine isomeric with hydrastine a.

See above references.

Hydrastinine (4 : 5-*Methylenedioxy*-2-β-methylaminoethylbenzaldehyde, 6-β-methylaminoethylpiperonal)



$C_{11}H_{13}O_3N$ MW, 207

Needles from pet. ether. M.p. 116–17°. Sol. non-polar solvents to colourless sols. Sol. H_2O ,

EtOH, etc., to yellow fluorescent sols. Alk. $KMnO_4$ → hydrastinic acid. NaOH → oxyhydrastinine, m.p. 98°.

N-Acetyl: needles from H_2O . M.p. 105°.

N-Benzoyl: m.p. 98–9°.

B, HCl : m.p. 212° decomp.

B, HI : m.p. 233–4°.

Oxime: m.p. 145–6°. *Mono-acetyl*: m.p. 90°.

Diacetyl: m.p. 121–2°.

B_2, H_2PtCl_6 : m.p. 207° decomp.

Methiodide: m.p. 267°.

Fritsch, *Ann.*, 1895, **286**, 18.

Freund, *Ann.*, 1892, **271**, 311; *Ber.*, 1889, **22**, 2330.

Hydrastinic Acid (3 : 4-[*Methylenedioxy*-6-methylcarbamy]l-benzoylformic acid)

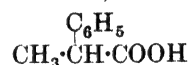


$C_{11}H_9O_6N$ MW, 251

Needles from H_2O . M.p. 164° decomp. Spar. sol. H_2O . Insol. $CHCl_3$. HNO_3 → hydrastic acid + $CH_3 \cdot NH_2$.

Freund, *Ann.*, 1892, **271**, 371; *Ber.*, 1889, **22**, 1159.

Hydratropic Acid (1-Phenylpropionic acid, α-methylphenylacetic acid)



$C_9H_{10}O_2$ MW, 150

B.p. 264–5°, 160°/25 mm. Spar. sol. H_2O . Alk. $KMnO_4$ → atrolactic acid.

Me ester: $C_{10}H_{12}O_2$. MW, 164. B.p. 221°, 119°/22 mm.

Et ester: $C_{11}H_{14}O_2$. MW, 178. B.p. 230°.

Chloride: C_9H_9OCl . MW, 168.5. B.p. 97–8°/12.5 mm.

Amide: $C_9H_{11}ON$. MW, 149. Needles from EtOH.Aq. M.p. 91–2°.

Nitrile: C_8H_7N . MW, 131. B.p. 230–2°. Sol. EtOH, Et_2O .

Janssen, *Ann.*, 1889, **250**, 136.

Neure, *ibid.*, 151.

Rupe, *Ann.*, 1909, **369**, 332.

Opolski, Kowalski, Pilewski, *Ber.*, 1916, **49**, 2282.

Hydrazine-carboxylic Acid.

See Hydrazinoformic Acid.

Hydrazine-dicarboxylic Acid.

See Hydrazoformic Acid.

Hydrazinoacetic Acid



$C_2H_5O_2N_2$ MW, 90

Cryst. from EtOH. M.p. 152°.
B, Hl: cryst. M.p. 156°.

Darapsky, Prabhakar, *Ber.*, 1912, **45**, 1662.

1-Hydrazinobutyric Acid

$$\begin{array}{c} \text{NH}\cdot\text{NH}_2 \\ | \\ \text{CH}_3\cdot\text{CH}_2\cdot\text{CH}\cdot\text{COOH} \end{array}$$

$\text{C}_4\text{H}_{10}\text{O}_2\text{N}_2$ MW, 118

Cryst. M.p. 208°.

Traube, Longinescu, *Ber.*, 1896, **29**, 674.

4-Hydrazino-1-ethylbenzene.

See *p*-Ethylphenylhydrazine.

Hydrazinoisobutyric Acid

$$\begin{array}{c} \text{NH}\cdot\text{NH}_2 \\ | \\ (\text{CH}_3)_2\text{C}\cdot\text{COOH} \end{array}$$

$\text{C}_4\text{H}_{10}\text{O}_2\text{N}_2$ MW, 118

Plates from EtOH. M.p. 237° decomp. Sol. H_2O . Insol. Et_2O , EtOH. Reduces $\text{NH}_3\cdot\text{AgNO}_3$ and Fehling's.

B, HCl: needles from H_2O . M.p. 156–7°.

B, H_2SO_4: needles from H_2O . M.p. 189°.

Et ester: $\text{C}_6\text{H}_{14}\text{O}_2\text{N}_2$. MW, 146. B.p. 93–5°/13 mm.

Thiele, Heuser, *Ann.*, 1896, **290**, 17.

1-Hydrazinoisovaleric Acid

$$\begin{array}{c} \text{NH}\cdot\text{NH}_2 \\ | \\ (\text{CH}_3)_2\text{CH}\cdot\text{CH}\cdot\text{COOH} \end{array}$$

$\text{C}_5\text{H}_{12}\text{O}_2\text{N}_2$ MW, 132

Plates from H_2O . M.p. 230–5° decomp. Spar. sol. H_2O .

Diacetyl deriv.: cryst. from EtOH. M.p. 205°.

Darapsky, *J. prakt. Chem.*, 1917, **96**, 283.

Hydrazinoformic Acid (*Hydrazine-carboxylic acid, carbazinic acid*)

$$\text{H}_2\text{N}\cdot\text{NH}\cdot\text{COOH}$$

$\text{CH}_4\text{O}_2\text{N}_2$ MW, 76

White powder. Decomp. about 90°.

Me ester: $\text{C}_3\text{H}_8\text{O}_2\text{N}_2$. MW, 90. Cryst. M.p. 75°. B.p. 108°/12 mm. Very sol. H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 . Insol. pet. ether. Volatile in steam. *B, HCl*: m.p. 160°.

Et ester: $\text{C}_3\text{H}_8\text{O}_2\text{N}_2$. MW, 104. Cryst. M.p. 46°. B.p. 108–9°/22 mm., 93°/9 mm.

Amide: see Semicarbazide.

Diels, Fritzsche, *Ber.*, 1911, **44**, 3022.

Diels, *Ber.*, 1914, **47**, 2186.

***p*-Hydrazinophenol.**

See *p*-Hydroxyphenylhydrazine.

1-Hydrazinopropionic Acid

$$\begin{array}{c} \text{NH}\cdot\text{NH}_2 \\ | \\ \text{CH}_3\cdot\text{CH}\cdot\text{COOH} \end{array}$$

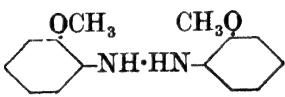
$\text{C}_3\text{H}_8\text{O}_2\text{N}_2$ MW, 104

Needles from EtOH. M.p. 181°. Very sol. H_2O . Insol. EtOH, Et_2O . Reduces Fehling's.

Et ester hydrochloride: $\text{C}_5\text{H}_{12}\text{O}_2\text{N}_2\cdot\text{HCl}$. MW, 168.5. Plates from EtOH. M.p. 108–10° decomp.

Davapsky, *J. prakt. Chem.*, 1917, **96**, 281.
 Bailey, Mikeska, *J. Am. Chem. Soc.*, 1916, **38**, 1782.

***o*-Hydrazoanisole** (2 : 2'-Dimethoxyhydrazobenzene)



$\text{C}_{14}\text{H}_{16}\text{O}_2\text{N}_2$ MW, 244

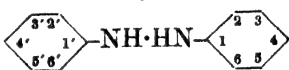
Plates. M.p. 102°. $\text{HCl} \rightarrow$ dianisidine.

Starke, *J. prakt. Chem.*, 1899, **59**, 209.

Wülfing, D.R.P., 100,234, (*Chem. Zentr.*, 1899, I, 720).

Nelson, U.S.P., 1,469,586, (*Chem. Abstracts*, 1923, **17**, 3878).

Hydrazobenzene (sym.-Diphenylhydrazine)



$\text{C}_{12}\text{H}_{12}\text{N}_2$ MW, 184

Plates or rhombohedra from EtOH– Et_2O . M.p. 126–7°. Sol. EtOH. Mod. sol. C_6H_6 . Spar. sol. H_2O . Insol. AcOH. Decomp. at m.p. \rightarrow azobenzene + aniline. HNO_2 , Cl, I, $\text{O}_3 \rightarrow$ azobenzene. KOH at 100° \rightarrow azobenzene + 2-hydroxyazobenzene. $\text{HCl} \rightarrow$ benzidine.

N-Me: $\text{C}_{13}\text{H}_{14}\text{N}_2$. MW, 198. Needles from ligroin. M.p. 75°. Sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O .

NN'-Di-Me: $\text{C}_{14}\text{H}_{16}\text{N}_2$. MW, 212. Oil. B.p. 138°/1 mm.

NN'-Di-Et: $\text{C}_{16}\text{H}_{20}\text{N}_2$. MW, 240. Oil. B.p. 141°/1 mm. Volatile in steam.

N-Acetyl: sym.-diphenylacetylhydrazide. $\text{C}_{14}\text{H}_{14}\text{ON}_2$. MW, 226. Needles from EtOH. M.p. 159°. Spar. sol. Et_2O . Insol. H_2O . Heat. \rightarrow acetanilide + azobenzene.

NN'-Diacetyl: yellow rhombohedra from EtOH. M.p. 105°. Sol. EtOH, Et_2O , AcOH. Spar. sol. H_2O . Conc. $\text{H}_2\text{SO}_4 \rightarrow$ benzidine.

N-Benzoyl: *NN'*-diphenylbenzhydrazide. Exists in two forms. (i) Prisms from EtOH,

Me₂CO, or AcOH. M.p. 38–9°. (ii) Plates from C₆H₆, CHCl₃, or pet. ether. M.p. 126°.

NN'-Dibenzoyl: prisms from EtOH. M.p. 161–2°. Sol. Me₂CO.

Darmstädter, D.R.P., 189,312, (*Chem. Zentr.*, 1907, II, 2002).

Ismailski, Kolpenski, Russian P., 29,172, (*Chem. Zentr.*, 1933, II, 3049).

Stern, *Ber.*, 1884, 17, 380.

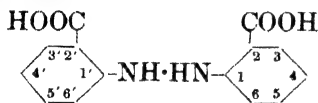
Schmidt, Schultz, *Ann.*, 1881, 207, 327.

Freundler, *Compt. rend.*, 1903, 136, 1553.

Rassow, *J. prakt. Chem.*, 1911, 84, 267.

Wieland, Fressel, *Ann.*, 1912, 392, 147.

Hydrazobenzene-2 : 2'-dicarboxylic Acid
(oo'-Hydrazobenzoic acid)



C₁₄H₁₂O₄N₂

MW, 272

Plates from EtOH. M.p. 205°. Stable when dry. Damp air → azobenzene-2 : 2'-dicarboxylic acid. Hot dil. H₂SO₄ → benzidine-3 : 3'-dicarboxylic acid.

Diamide: C₁₄H₁₄O₂N₄. MW, 270. Needles from AcOH. M.p. 233°. Sol. Me₂CO, AcOH. Spar. sol. EtOH, Et₂O, CHCl₃.

Homolka, *Ber.*, 1884, 17, 1904.

Schultz, Rohde, Vicari, *Ann.*, 1907, 352, 129.

Heller, *Ber.*, 1910, 43, 1914.

Hydrazobenzene-2 : 3'-dicarboxylic Acid
(om'-Hydrazobenzoic acid).

Needles from EtOH.Aq. M.p. 206° decomp. Sol. ord. org. solvents.

Paal, Fritzweiler, *Ber.*, 1892, 25, 3597.

Hydrazobenzene-3 : 3'-dicarboxylic Acid
(mm'-Hydrazobenzoic acid).

Yellow flakes from EtOH.Aq. Spar. sol. EtOH. Insol. H₂O. Alk. sol. in air → azobenzene-3 : 3'-dicarboxylic acid. Reduces NH₃.AgNO₃.

Strecker, *Ann.*, 1864, 129, 141.

Hydrazobenzene-4 : 4'-dicarboxylic Acid
(pp'-Hydrazobenzoic acid).

Needles from EtOH. Insol. H₂O.

Di-Ester: C₁₈H₂₀O₄N₂. MW, 328. Needles from EtOH.Aq. M.p. 118°. Sol. EtOH, Me₂CO, CHCl₃, AcOEt. Spar. sol. pet. ether. Insol. H₂O. Oxidises readily.

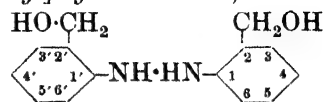
Bilfinger, *Ann.*, 1865, 135, 159.

Krösche, *Chem. Zentr.*, 1915, II, 1186.

Hydrazobenzoic Acid.

See Hydrazobenzene-dicarboxylic Acid.

o-Hydrazobenzyl Alcohol (2 : 2'-Di-[hydroxymethyl]-hydrazobenzene)



C₁₄H₁₆O₂N₂

MW, 244

M.p. 200°. Undergoes benzidine rearrangement to 3 : 3'-di-[hydroxymethyl]-benzidine.

Diacetyl: m.p. above 250°.

Dibenzoyl: m.p. 107°.

Sen, Sadasivan, *J. Ind. Chem. Soc.*, 1932, 9, 403.

m-Hydrazobenzyl Alcohol (3 : 3'-Di-[hydroxymethyl]-hydrazobenzene).

M.p. 268°. Undergoes benzidine rearrangement to 2 : 2'-di-[hydroxymethyl]-benzidine.

Diacetyl: m.p. above 220°.

See previous reference.

Hydrazodiacetyl.

See sym.-Diacetylhydrazine.

Hydrazodibenzoyl.

See sym.-Dibenzoylhydrazine.

Hydrazodibenzyl.

See sym.-Dibenzylhydrazine.

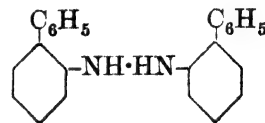
Hydrazodicarbonimide.

See Urazole.

Hydrazodicarboxylic Acid.

See Hydrazoformic Acid.

o-Hydrazodiphenyl (NN'-Di-o-diphenylhydrazine, NN'-di-o-xenylhydrazine, 2 : 2'-hydrazodiphenyl)



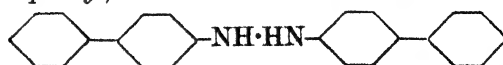
C₂₄H₂₀N₂

MW, 336

Needles from EtOH. M.p. 182°. Hot. conc. HCl → 3 : 3'-diphenylbenzidine.

Friebel, Rassow, *J. prakt. Chem.*, 1901, 63, 459.

p-Hydrazodiphenyl (NN'-Di-p-diphenylhydrazine, NN'-di-p-xenylhydrazine, 4 : 4'-hydrazodiphenyl)



C₂₄H₂₀N₂

MW, 336

Plates. M.p. 167–9°. Spar. sol. EtOH. Insol. H₂O. HCl at 100° → 4-aminodiphenyl.

Friebel, Rassow, *J. prakt. Chem.*, 1901, 63, 449.

Hydrazoditoluyl.

See Ditoluylhydrazine.

Hydrazoethane.

See sym.-Diethylhydrazine.

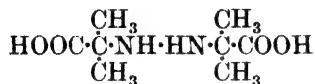
Hydrazoformic Acid (*Hydrazo-dicarboxylic acid*, sym.-hydrazine-dicarboxylic acid)

Di-Me ester: $\text{C}_4\text{H}_8\text{O}_4\text{N}_2$. MW, 148. Prisms or needles. M.p. 132° . Very sol. H_2O , EtOH. Spar. sol. Et_2O . Insol. pet. ether.

Di-Et ester: $\text{C}_6\text{H}_{12}\text{O}_4\text{N}_2$. MW, 176. Prisms from H_2O . M.p. 130° . B.p. about 250° with slight decomp. Very sol. EtOH, Et_2O . Spar. sol. cold H_2O .

Diamide: $\text{C}_2\text{H}_6\text{O}_2\text{N}_4$. MW, 118. Needles from H_2O . M.p. 248° . Spar. sol. H_2O . Insol. EtOH, Et_2O . *Diacetyl deriv.*: cryst. from H_2O . M.p. above 300° .

Me ester-amide: $\text{C}_3\text{H}_7\text{O}_3\text{N}_3$. MW, 133. Cryst. from EtOH. M.p. $169-70^\circ$.

Diels, Fritzsche, *Ber.*, 1911, **44**, 3025.Diels, Paquin, *Ber.*, 1913, **46**, 2007.Curtius, Heidenreich, *J. prakt. Chem.*, 1895, **52**, 476.**1 : 1'-Hydrazoisobutyric Acid**

Prisms from H_2O . M.p. $223-4^\circ$. Sol. H_2O . Spar. sol. EtOH, Et_2O , AcOEt.

Di-Me ester: $\text{C}_{10}\text{H}_{20}\text{O}_4\text{N}_2$. MW, 232. Prisms from ligroin. M.p. $53-4^\circ$. B.p. 216° .

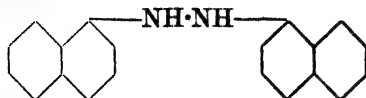
Di-Et ester: $\text{C}_{12}\text{H}_{24}\text{O}_4\text{N}_2$. MW, 260. B.p. $231-3^\circ$. D_4^{25} 0.99784.

Mononitrile: $\text{C}_8\text{H}_{15}\text{O}_2\text{N}_3$. MW, 185. Cryst. from Et_2O or ligroin. M.p. 100° . Very sol. Et_2O , EtOH. Spar. sol. ligroin.

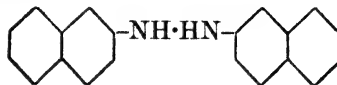
Dinitrile: $\text{C}_8\text{H}_{14}\text{N}_4$. MW, 166. Plates from Et_2O . M.p. $92-3^\circ$. Very sol. EtOH, Et_2O . Insol. H_2O .

Thiele, Heuser, *Ann.*, 1896, **290**, 21.Gabriel, *Ber.*, 1911, **44**, 60 (note).**Hydrazomethane.**

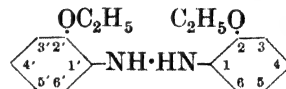
See sym.-Dimethylhydrazine.

1 : 1'-Hydrazonaphthalene (sym.-Di-1-naphthylhydrazine)

Colourless plates from pet. ether. M.p. 153° . Insol. H_2O . Spar. sol. EtOH, pet. ether. Sol. C_6H_6 . Gradually oxidises in air \rightarrow 1 : 1'-azonaphthalene. Acids \rightarrow dinaphthylene.

Cumming, Howie, *J. Chem. Soc.*, 1933, 134.**2 : 2'-Hydrazonaphthalene** (sym.-Di-2-naphthylhydrazine)

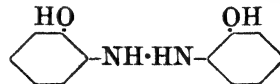
Red plates from C_6H_6 . M.p. $140-1^\circ$. Very sol. most org. solvents. Oxidises in air \rightarrow 2 : 2'-azonaphthalene.

Meisenheimer, Witte, *Ber.*, 1903, **36**, 4160.**o-Hydrazophenetole** (2 : 2'-Diethoxyhydrazobenzene)

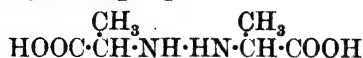
Needles from EtOH. M.p. 89° . Oxidises in air \rightarrow 2 : 2'-diethoxyazobenzene. Conc. HCl \rightarrow di-o-phenetidine.

Schmitt, Möhlau, *J. prakt. Chem.*, 1878, **18**, 202.**m-Hydrazophenetole** (3 : 3'-Diethoxyhydrazobenzene).Needles, from EtOH. M.p. $118-19^\circ$.Kinzel, *Arch. Pharm.*, 1891, **229**, 351.**p-Hydrazophenetole** (4 : 4'-Diethoxyhydrazobenzene).

Cryst. from pet. ether or EtOH. M.p. 86° . Very sol. EtOH, Et_2O , CS_2 . HCl \rightarrow isodi-phenetidine.

Buchstab, *J. prakt. Chem.*, 1884, **29**, 300.**o-Hydrazophenol** (o-Dihydroxyhydrazobenzene)M.p. 148° .*Dibenzoyl deriv.*: m.p. 186° .*Di-Me ether*: see o-Hydrazoanisole.*Di-Et ether*: see o-Hydrazophenetole.Sen, Sadasivan, *J. Ind. Chem. Soc.*, 1932, **9**, 405.

1 : 1'-Hydrazopropionic Acid

 $\text{C}_6\text{H}_{12}\text{O}_4\text{N}_2$

MW, 176

Needles from H_2O . M.p. 198° decomp.*Di-Me ester*: $\text{C}_8\text{H}_{16}\text{O}_4\text{N}_2$. MW, 204. Cryst. from ligroin. M.p. 93° . B.p. $220^\circ/720$ mm.*Di-Et ester*: $\text{C}_{10}\text{H}_{20}\text{O}_4\text{N}_2$. MW, 232. Prisms from ligroin. M.p. 78° . B.p. $245^\circ/750$ mm.Thiele, Bailey, *Ann.*, 1898, 303, 90.

Hydrazotoluidine.

See 5 : 5'-Diamino-2 : 2'-dimethylhydrazobenzene.

Hydrazotoluene.

See Dimethylhydrazobenzene.

Hydrazo-xylene.

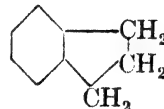
See Tetramethylhydrazobenzene.

1-Hydrindamine (1-Aminohydrindene, α -hydrindamine, 1-indanamine) $\text{C}_9\text{H}_{11}\text{N}$

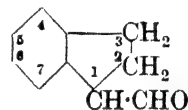
MW, 133

Oil. B.p. $220.5^\circ/747$ mm., $96-7^\circ/8$ mm. Absorbs CO_2 rapidly. Optically resolvable into *d*- and *l*-forms.*B.HCl*: m.p. 208° . Sol. H_2O , EtOH.*B.H_2SO_4*: m.p. $256-7^\circ$ decomp.*N-Me*: $\text{C}_{10}\text{H}_{13}\text{N}$. MW, 147. B.p. $106-7^\circ/15$ mm.*N-Benzoyl*: needles from EtOH. M.p. $142-3^\circ$.*Picrate*: yellow prisms from H_2O . M.p. 207° .König, *Ann.*, 1893, 275, 348.Courtot, Dondelinger, *Ann. chim.*, 1925, 4, 231; *Compt. rend.*, 1924, 178, 493.**2-Hydrindamine** (2-Aminohydrindene, β -hydrindamine, 2-indanamine).Colourless oil. B.p. $229^\circ/753$ mm. Absorbs $\text{CO}_2 \rightarrow$ cryst. carbonate. Salts very sol. H_2O .*B.HCl*: plates from conc. HCl. M.p. 241° .*N-Acetyl*: cryst. from EtOH.Aq. M.p. $126-7^\circ$.*N-Benzoyl*: plates from EtOH.Aq. M.p. 155° .*Picrate*: yellow prisms. M.p. 239° decomp.Kenner, Mathews, *J. Chem. Soc.*, 1914, 105, 746.**4-Hydrindamine** (4-Aminohydrindene, 4-indanamine).M.p. -3° . B.p. $235^\circ/754$ mm.*N-Acetyl*: m.p. 126° .*N-Benzoyl*: white plates from EtOH. M.p. 136° .Goth, *Ber.*, 1928, 61, 1459.**5-Hydrindamine** (5-Aminohydrindene, 5-indanamine).Needles from pet. ether. M.p. $37-8^\circ$. B.p. $247-9^\circ/745$ mm., $146-7^\circ/25$ mm., $131^\circ/15$ mm.

Very sol. most org. solvents.

N-Acetyl: m.p. 106° .*N-Benzoyl*: m.p. 137° .Borsche, John, *Ber.*, 1924, 57, 658.Lindner, Bruhin, *Ber.*, 1927, 60, 439.**Hydrindene** (Dihydroindene, indane) C_9H_{10}

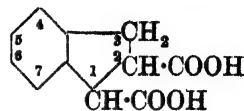
MW, 118

Oil. B.p. 177° . D_4^{20} 0.9645. n_D 1.5381.Borsche, Pommer, *Ber.*, 1921, 54, 102.**Hydrindene-1-aldehyde** (1-Indanaldehyde, 1-aldehydohydrindene) $\text{C}_9\text{H}_{10}\text{O}$

MW, 134

Oil. B.p. $135^\circ/30$ mm.*Oxime*: cryst. from toluene. M.p. $103-4^\circ$.*Semicarbazone*: needles from EtOH. M.p. $167-8^\circ$.Tiffeneau, Orékhoff, *Bull. soc. chim.*, 1920, 27, 789.**Hydrindene-2-aldehyde** (2-Indanaldehyde, 2-aldehydohydrindene).Oil. B.p. $122^\circ/12$ mm.*Semicarbazone*: needles from EtOH. M.p. 174° .Kenner, *J. Chem. Soc.*, 1914, 105, 2694.**Hydrindene-5-aldehyde** (5-Indanaldehyde, 5-aldehydohydrindene).Oil. B.p. $255-7^\circ$.*Oxime*: plates from EtOH. M.p. 65° .Gattermann, *Ann.*, 1906, 347, 385.**Hydrindene-carboxylic Acid.**

See Hydrindenic Acid.

Hydrindene-1 : 2-dicarboxylic Acid (Indane-1 : 2-dicarboxylic acid) $\text{C}_{11}\text{H}_{10}\text{O}_4$

MW, 206

M.p. 222°. Sol. EtOH, Me₂CO. Spar. sol. Et₂O, C₆H₆.

Bougault, *Compt. rend.*, 1914, 159, 747.

Hydrindene-2 : 2-dicarboxylic Acid (*Indane-2 : 2-dicarboxylic acid*).

Plates from H₂O. M.p. 199°. Heat above m.p. → hydrindene-2-carboxylic acid.

Di-Et ester: C₁₅H₁₈O₄. MW, 262. Needles from EtOH. M.p. 38°. B.p. 186°/19 mm.

Dichloride: C₁₁H₈O₂Cl₂. MW, 243. Plates from pet. ether. M.p. 45°. B.p. 173-5°/20 mm.

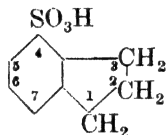
Perkin, *J. Chem. Soc.*, 1888, 53, 7.

Perkin, Révay, *J. Chem. Soc.*, 1894, 65, 232.

Thole, Thorpe, *J. Chem. Soc.*, 1911, 99, 2186.

Kenner, *J. Chem. Soc.*, 1914, 105, 2697.

Hydrindene-4-sulphonic Acid (*Indane-4-sulphonic acid*)



C₉H₁₀O₃S MW, 198

Amide: C₉H₁₁O₂NS. MW, 197. Cryst. from H₂O. M.p. 91.5-92.5°.

Spilker, *Ber.*, 1893, 26, 1541.

Hydrindene-5-sulphonic Acid (*Indane-5-sulphonic acid*).

Cryst. M.p. 92°.

Amide: plates from H₂O. M.p. 135.5-136°. Sol. EtOH.

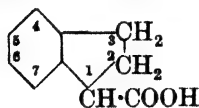
Chloride: C₉H₉O₂ClS. MW, 216.5. Cryst. from Et₂O. M.p. 47° (45°).

Anilide: needles from EtOH. M.p. 129°.

Spilker, *Ber.*, 1893, 26, 1540.

Moschner, *Ber.*, 1900, 33, 739.

1-Hydrindenic Acid (*Hydrindene-1-carboxylic acid, indane-1-carboxylic acid*)



C₁₀H₁₀O₂ MW, 162

Needles from Et₂O. M.p. 59-60°.

Tiffeneau, Orékhoff, *Bull. soc. chim.*, 1920, 27, 789.

2-Hydrindenic Acid (*Hydrindene-2-carboxylic acid, indane-2-carboxylic acid*).

Needles from H₂O. M.p. 130°. B.p. 182-

92°/18 mm. Very sol. C₆H₆. Sol. 120 parts boiling H₂O.

Me ester: C₁₁H₁₂O₂. MW, 176. Low melting solid. B.p. 170°/60 mm.

Chloride: C₁₀H₉OCl. MW, 180.5. Prisms. M.p. 35-8°. B.p. 180°/100 mm.

Amide: C₁₀H₁₁ON. MW, 161. Prisms from MeOH. M.p. 178°. Very sol. EtOH. Spar. sol. CHCl₃.

Anilide: C₁₆H₁₅ON. MW, 237. Plates from EtOH. M.p. 182°. Sol. AcOH. Spar. sol. CHCl₃, pet. ether.

Perkin, Révay, *J. Chem. Soc.*, 1894, 65, 233.

5-Hydrindenic Acid (*Hydrindene-β-carboxylic acid, hydrindene-5-carboxylic acid, indane-5-carboxylic acid*).

Cryst. from EtOH.Aq. or C₆H₆. M.p. 178-9° (183°). Very sol. EtOH.

Amide: cryst. from EtOH. M.p. 137-8°.

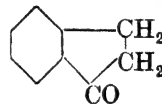
Chloride: b.p. 140-2°/12 mm.

Anilide: needles from EtOH. M.p. 126°.

v. Braun, Kirschbaum, Schulmann, *Ber.*, 1920, 53, 1159.

Borsch, Pommer, *Ber.*, 1921, 54, 107.

1-Hydrindone (*1-Indanone, 1-ketohydrindene*)



C₉H₈O MW, 132

Plates from pet. ether. M.p. 42°. B.p. 241-2°/739 mm., 129°/13 mm., 111-16°/23 mm. Very sol. EtOH, Et₂O, CHCl₃. Sol. pet. ether. Spar. sol. H₂O. D₄²⁰ 1.1028. n_D²⁵ 1.561.

Oxime: needles from EtOH. M.p. 146°. Sol. EtOH, Et₂O, AcOH, C₆H₆.

Semicarbazone: plates + 7H₂O from AcOH.Aq. M.p. 233° (239°). Spar. sol. EtOH.Aq. Insol. CHCl₃, pet. ether, C₆H₆.

Phenylhydrazone: m.p. 134-5° (in vacuo).

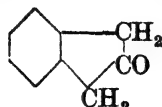
2 : 4-Dinitrophenylhydrazone: orange red cryst. M.p. 258°.

Courtot, Krolkowski, *Compt. rend.*, 1926, 182, 322.

Revis, Kipping, *J. Chem. Soc.*, 1897, 71, 241.

Wislicenus, König, *Ann.*, 1893, 275, 342.

2-Hydrindone (*2-Indanone, 2-ketohydrindene*)



C₉H₈O

MW, 132

Needles from EtOH or Et₂O. M.p. 58° (59°, 61°). Very sol. EtOH, Et₂O, Me₂CO, CHCl₃. Insol. H₂O. Volatile in steam. Ox. → homo-phthalic acid.

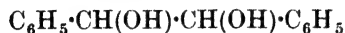
Oxime: needles from EtOH.Aq. or CHCl₃. M.p. 155° (153-4°). Very sol. EtOH, Et₂O, Me₂CO, CHCl₃.

Semicarbazone: needles from EtOH. M.p. 218° decomp.

Walters, *J. Soc. Chem. Ind.*, 1927, **46**, 150.

Wislicenus, Benedikt, *Ann.*, 1893, **275**, 255.

Hydrobenzoin (*Diphenylethylene glycol*, αβ-dihydroxy-sym.-diphenylethane, αβ-dihydroxydi-benzyl)



C₁₄H₁₄O₂ MW, 214

Plates from EtOH. M.p. 138° (134°). Very sol. hot EtOH. Sol. 80 parts boiling H₂O. Ox. → benzoin.

Me ether: C₁₅H₁₆O₂. MW, 228. Prisms from EtOH-pet. ether. M.p. 100-2°.

Di-Me ether: C₁₆H₁₈O₂. MW, 242. Prisms from Et₂O. M.p. 140-2°.

Mono-acetyl: needles from AcOH.Aq. M.p. 84°. Very sol. EtOH, Et₂O, AcOH.

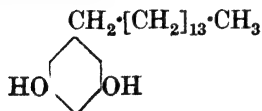
Diacetyl: prisms from Et₂O. M.p. 134° (135°). Sol. EtOH, Et₂O, CHCl₃, C₆H₆.

Buck, Jenkins, *J. Am. Chem. Soc.*, 1929, **51**, 2163.

Forst, Zincke, *Ann.*, 1876, **182**, 262, 275.

Irvine, Weir, *J. Chem. Soc.*, 1907, **91**, 1390.

Hydrobilobol (3:5-Dihydroxypentadecylbenzene 5-pentadecylresorcinol)



C₂₁H₃₆O₂ MW, 320

Needles from ligroin. M.p. 89-90°. FeCl₃ gives no col.

Diacetyl: needles from EtOH.Aq. M.p. 56°.

Kawamura, *Japan J. Chem.*, 1928, **3**, 103.

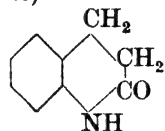
Furakawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1935, **26**, 178.

Hydrocaffeic Acid.

See 3:4-Dihydroxyhydrocinnamic Acid.

Hydrocarbostryl (2-Keto-1:2:3:4-tetra-

hydroquinoline, o-aminohydrocinnamic lactam, dihydro-α-quinolone)



C₉H₉ON

MW, 147

Prisms from MeOH.Aq. M.p. 163°. Very sol. EtOH, Et₂O. Insol. H₂O.

N-Me: C₁₀H₁₁ON. MW, 161. Oil. B.p. 160°/15 mm.

N-Benzoyl: prisms. M.p. 155-8°.

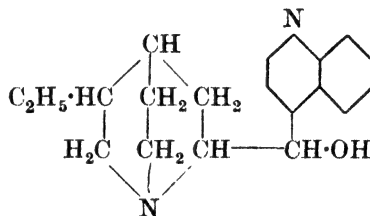
Mayer, Zütphen, Philipps, *Ber.*, 1927, **60**, 861.

Mayer, Philipps, Rupert, Schmitt, *Ber.*, 1928, **61**, 1966.

Hydrochelidonic Acid.

See 3-Ketopimelic Acid.

Hydrocinchonidine



C₁₉H₂₄ON₂

MW, 296

Constituent of cinchona bark. Leaflets from EtOH. M.p. 229°. [α]_D - 98.4° in EtOH. Spar. sol. most solvents except EtOH.

B, HCl, 2H₂O: prisms. M.p. 202.3° anhyd. [α]_D - 98.4°. Very sol. H₂O, EtOH.

Methiodide: m.p. 248°.

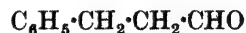
Skita, Nord, *Ber.*, 1912, **45**, 3312.

Emde, *Helv. Chim. Acta*, 1932, **15**, 557.

Hydrocinchonine.

See Cinchotine.

Hydrocinnamaldehyde (2-Phenylpropionaldehyde, benzylacetaldehyde, hydrocinnamic aldehyde)



C₉H₁₀O

MW, 134

Present in cortex of *Cinnamomum ceylanicum*, Nees, and leaves of *Cinnamomum Cassia*, Bl. B.p. 221-4°/744 mm., 104-5°/13 mm.

Di-Me acetal: C₁₁H₁₆O₂. MW, 180. B.p. 240°, 114°/15 mm.

Oxime: prisms from EtOH. M.p. 93-94.5°.

Semicarbazone: plates. M.p. 127°.

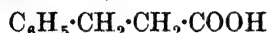
p-Nitrophenylhydrazone: m.p. 122–3°.

Fischer, Hoffa, *Ber.*, 1898, **31**, 1992.

Dollfus, *Ber.*, 1893, **26**, 1971.

Michael, Garner, *Am. Chem. J.*, 1906, **35**, 266.

Hydrocinnamic Acid (2-Phenylpropionic acid, benzylacetic acid)



$\text{C}_9\text{H}_{10}\text{O}_2$ MW, 150

Prisms from pet. ether. M.p. 47° (48.5°). B.p. 280°/754 mm. D_4^{25} 1.07115. $k = 2.2 \times 10^{-5}$ at 25°. Sol. EtOH, Et₂O, CHCl₃, CS₂, AcOH, C₆H₆. Sol. 6 to 7 parts pet. ether. Sol. 168 parts H₂O at 20°. Volatile in steam.

Me ester: $\text{C}_{10}\text{H}_{12}\text{O}_2$. MW, 164. B.p. 238–9°/756.5 mm. D_4^0 1.0455.

Ester: $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. B.p. 247.2°/760 mm. D_4^0 1.0343, D_4^1 1.0302. n_D^{20} 1.49542.

Chloride: $\text{C}_9\text{H}_9\text{OCl}$. MW, 168.5. B.p. 105°/10 mm., 115–16°/11–12 mm.

Amide: $\text{C}_9\text{H}_{11}\text{ON}$. MW, 149. Needles from H₂O. M.p. 105°. Very sol. EtOH, Et₂O.

Nitrile: $\text{C}_9\text{H}_9\text{N}$. MW, 131. B.p. 261°, 114–18°/8 mm. D^{18} 1.0014.

Anhydride: $\text{C}_{18}\text{H}_{18}\text{O}_3$. MW, 282. B.p. 216–17°/14 mm.

Anilide: cryst. from pet. ether. M.p. 98°.

Ingersoll, *Organic Syntheses*, Collective Vol. I, 304.

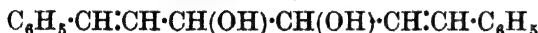
Erlenmeyer, *Ann.*, 1866, **137**, 334.

Hoffmann, *Ber.*, 1885, **18**, 2740.

Hydrocinnamic Aldehyde.

See Hydrocinnamaldehyde.

Hydrocinnamoin (Distyrylethylene glycol, 3:4-dihydroxy-1:6-diphenylhexadiene-1:5, 1:4-dibenzylidene-ψ-butylene glycol)



$\text{C}_{18}\text{H}_{18}\text{O}_2$ MW, 266

Plates from EtOH. M.p. 156°. Spar. sol. EtOH, Et₂O. Heat → terphenyl.

Diacetyl: prisms from EtOH. M.p. 118–19°. Sol. CHCl₃. Mod. sol. EtOH, AcOH.

Dibenzoyl: m.p. 169–70°.

Thiele, *Ber.*, 1899, **32**, 1296.

Kuhn, Winterstein, *Ber.*, 1927, **60**, 433.

Kuhn, Winterstein, *Helv. Chim. Acta*, 1928, **11**, 104.

Hydrocinnamyl Alcohol (3-Phenyl-*n*-propyl alcohol, 3-phenylpropanol-1, γ-hydroxypropylbenzene)



$\text{C}_9\text{H}_{12}\text{O}$ MW, 136

Dict. of Org. Comp.—II.

B.p. 235°, 119°/12 mm. D_{17}^{25} 1.007, D_4^{25} 0.995. n_D^{25} 1.53565.

Me ether: $\text{C}_{10}\text{H}_{14}\text{O}$. MW, 150. B.p. 206.5°, 92–4°/12 mm. D_4^{15} 0.999.

Et ether: $\text{C}_{11}\text{H}_{16}\text{O}$. MW, 164. B.p. 224°. D_4^{15} 0.824.

Phenyl ether: b.p. 171–2°/11 mm.

p-Nitrobenzoyl: cryst. from EtOH. M.p. 45–6°.

Straus, Berkow, *Ann.*, 1913, **401**, 151.

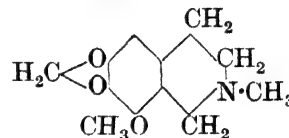
Hydroconchinene.

See Hydroquinidine.

Hydroconquinine.

See Hydroquinidine.

Hydrocotarnine (8-Methoxy-6:7-methylene-dioxy-N-methyltetrahydroisoquinoline)



$\text{C}_{12}\text{H}_{15}\text{O}_3\text{N}$ MW, 221

Constituent of opium alkaloids. Cryst. + $\frac{1}{2}\text{H}_2\text{O}$ from EtOH. M.p. 55–6°. Sol. most org. solvents. Insol. H₂O, alkalis.

B,HBr: m.p. 236–7°. Spar. sol. H₂O.

B,HI: colourless needles from MeOH. M.p. 195–6°.

Methiodide: prisms from MeOH. M.p. 206–7°.

Beckett, Wright, *J. Chem. Soc.*, 1875, **28**, 577.

Bandow, Wolfenstein, *Ber.*, 1898, **31**, 1577.

Steiner, *Compt. rend.*, 1923, **176**, 224.

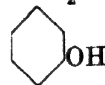
Hydrocotoin.

See under Cotoin.

***o*-Hydrocoumaric Acid**.

See Melilotic Acid.

***m*-Hydrocoumaric Acid** (*m*-Hydroxyhydrocinnamic acid)



$\text{C}_9\text{H}_{10}\text{O}_3$ MW, 166

Needles from C₆H₆-pet. ether. M.p. 111°.

Me ether: see *m*-Methoxyhydrocinnamic Acid.

Tiemann, Ludwig, *Ber.*, 1882, **15**, 2050.

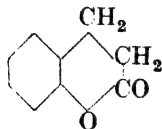
Braunstein, *Ber.*, 1882, **15**, 2051.

***p*-Hydrocoumaric Acid**.

See Phloretic Acid.

Hydrocoumarin (3:4-Dihydrocoumarin, 2-

hydroxyhydrocinnamic lactone, melilotol, melilotic lactone)



$C_9H_8O_2$

MW, 148

Occurs in *Melilotus officinalis*. Leaflets. M.p. 25°. B.p. 272°. Sol. $CHCl_3$. Mod. sol. EtOH, Et_2O . Insol. cold H_2O . $KOH \rightarrow$ melilotic acid.

Zwenger, *Ann. Suppl.*, 1867, 5, 106.

Hydrocuprean

$C_{19}H_{24}ON_2$

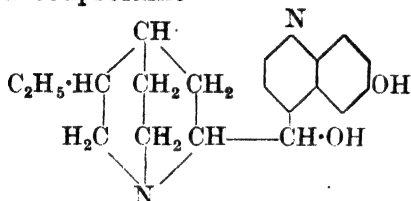
MW, 296

Plates from $CHCl_3-Et_2O$. M.p. 173°. Sol. dil. acids, alcohols, $CHCl_3$. Insol. H_2O , pet. ether, alk. carbonates. $[\alpha]_D^{20}$ 90.0°.

$B, 2HCl$: leaflets from EtOH- Et_2O . M.p. 191-2° (sinters at 185°).

Giemsa, Halberkann, *Ber.*, 1921, 54, 1175.

Hydrocupreidine



$C_{19}H_{24}O_2N_2$

MW, 312

Glistening plates. M.p. 193°. Readily sol. MeOH, EtOH. Sol. Me_2CO , $CHCl_3$. Spar. sol. Et_2O . $[\alpha]_D^{20} + 242.5^\circ$ in EtOH.

B, HCl, H_2O : needles from EtOH.Aq. M.p. 231-3°. $[\alpha]_D^{24} + 194.2^\circ$ in H_2O .

$B, 2HBr$: yellow plates. M.p. above 275°.

B, HI, H_2O : pink plates from H_2O . M.p. 209-12°.

B, HNO_3, H_2O : cream-coloured cryst. from EtOH.Aq. M.p. 175-80°.

Methiodide: yellow cryst. from H_2O . M.p. 295°. $[\alpha]_D^{20}$ 202.6° in 50% EtOH.

Heidelberger, Jacobs, *J. Am. Chem. Soc.*, 1919, 41, 827.

Giemsa, Bonath, *Ber.*, 1925, 58, 93.

Ghosh, Chatterjee, *J. Indian Chem. Soc.*, 1932, 9, 83.

Hydrocupreine.

Stereoisomer of hydrocupreidine (above). Plates from EtOH.Aq. M.p. 230° after softening at 185-90°. $[\alpha]_D^{25} - 159.2^\circ$ in abs. EtOH.

B, HCl : needles. M.p. 280° decomp. $[\alpha]_D^{22.5} - 132.3^\circ$. Sol. MeOH, EtOH. Spar. sol. $CHCl_3$, Me_2CO , H_2O .

$B, 2HBr$: prisms from H_2O . M.p. 180-90°. Sol. MeOH, EtOH. Spar. sol. $CHCl_3$, Me_2CO .

B, HNO_3 : needles. M.p. 220-2°. Readily sol. EtOH, MeOH. Sol. Me_2CO . Spar. sol. $CHCl_3$, C_6H_6 .

Heidelberger, Jacobs, *J. Am. Chem. Soc.*, 1919, 41, 821.

Giemsa, Bonath, *Ber.*, 1925, 58, 92.

Hydrocyanic Acid (Prussic acid, formonitrile, hydrogen cyanide)

HCN

CHN

MW, 27

Colourless liq. Burns with violet flame. M.p. -14°. B.p. 26°. D_{16}^{20} 0.6969. Misc. in all proportions with H_2O , EtOH, Et_2O . n_D^{20} 1.254. Heat of comb. (vapour) C_p 158.62 Cal. $k = 13 \times 10^{-10}$. Very weak acid: only faintly redens litmus. Aq. sols. unstable. $Zn + H_2SO_4$ or $HCl \rightarrow$ methylamine. Warm min. acids \rightarrow formic acid + ammonia. Combines with aldehydes and ketones to give cyanhydrins. HCl at -15° \rightarrow formimide chloride. Very poisonous, 0.06 gm. causing death.

Ziegler, *Organic Syntheses*, Collective Vol. I, 307.

Hydroduroquinone.

See Durohydroquinone.

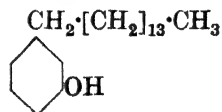
Hydrofuramide.

See Furfuramide.

Hydrogen cyanide.

See Hydrocyanic Acid.

Hydroginkgol (*m*-Hydroxypentadecylbenzene, 3-pentadecylphenol, cyclogallipharol)



$C_{21}H_{36}O$

MW, 304

Needles from pet. ether. M.p. 50.5-51°.

Me ether: $C_{22}H_{38}O$. MW, 318. M.p. 22°. B.p. 240-4°/15 mm.

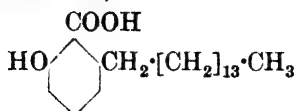
p-Nitrobenzoyl: cryst. from Me_2CO . M.p. 60-61.5°.

Kawamura, *Japan J. Chem.*, 1928, 3, 89.

Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, 24, 304, 320.

Hydroginkgolic Acid (6-Hydroxy-2-penta-

decylbenzoic acid, 6-pentadecylsalicylic acid, cyclogallipharic acid)



$C_{22}H_{36}O_3$

MW, 348

Needles from pet. ether. M.p. 86–8°. Very sol. EtOH, Me₂CO, Et₂O, C₆H₆, CHCl₃.

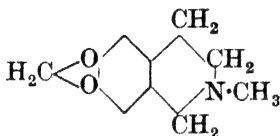
Acetyl: needles from pet. ether. M.p. 73–74.5°.

p-Nitrobenzoyl: needles from ligroin. M.p. 87–9°.

Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1935, **26**, 178.

See also first reference above.

Hydrohydrastinine (6 : 7-Methylenedioxy-N-methyltetrahydroisoquinoline)



$C_{11}H_{13}O_2N$

MW, 191

Cryst. M.p. 66° (60–1°). Ox. → hydrastinine. Sol. EtOH, MeOH, Me₂CO, CS₂, C₆H₆.

B,HCl: cryst. M.p. 273–4°.

B,HBr: cryst. M.p. 272°.

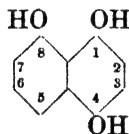
B,HI: cryst. M.p. 232°.

Methide: needles from H₂O. M.p. 227–8°.

Fritsch, *Ann.*, 1895, **286**, 18.

Freund, Dormeyer, *Ber.*, 1891, **24**, 2734.

α-Hydrojuglone (1 : 4 : 8-Trihydroxynaphthalene)



$C_{10}H_8O_3$

MW, 176

Present in leaves of *Juglans regia*, Linn. Leaflets or needles. M.p. 168–9°. Sol. EtOH, Et₂O. Spar. sol. H₂O, C₆H₆. Insol. CHCl₃. Heat. → β-hydrojuglone.

Mylius, *Ber.*, 1885, **18**, 2569.

Willstätter, Wheeler, *Ber.*, 1914, **47**, 2799.

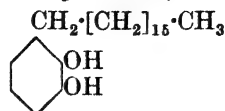
β-Hydrojuglone (1 : 4 : 7-Trihydroxynaphthalene).

Present in leaves of *Juglans regia*, Linn. Plates or needles from EtOH. M.p. 96–7°. Sol. CHCl₃, C₆H₆. Spar. sol. EtOH, Et₂O. Volatile in steam. FeCl₃ → deep red col. Heat with dil. HCl → α-hydrojuglone.

Triacetyl: prisms from EtOH. M.p. 129–30°. Insol. H₂O. Sublimes undecomp.

See previous references.

Hydrolaccol (2 : 3-Dihydroxy-1-heptadecylbenzene, 3-heptadecylcatechol)



$C_{23}H_{40}O_2$

MW, 348

Cryst. from pet. ether. M.p. 63–4°. B.p. 200–20°/0.05 mm.

Di-Me ether: $C_{25}H_{44}O_2$. MW, 376. Prisms from EtOH. M.p. 43–4°.

Majima, *Ber.*, 1922, **55**, 197.

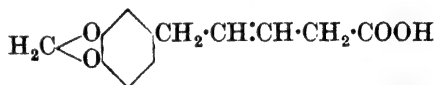
β-Hydromuconic Acid.

See Dihydromuconic Acid.

Hydrophlorone.

See 2 : 5-Dihydroxy-p-xylene.

α-Hydripiperic Acid (4-[3 : 4-Methylenedioxyphenyl]-2-butylene-1-carboxylic acid, 3 : 4-methylenedioxyphenylethylidenepropionic acid, 3 : 4-methylenedioxyphenylpropenylacetic acid)



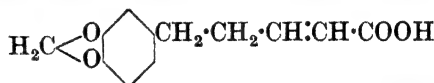
$C_{12}H_{12}O_4$

MW, 220

Cryst. from pet. ether. M.p. 75–6° (78°). NaOH → β-hydripiperic acid.

Weinstein, *Ann.*, 1885, **227**, 32.

β-Hydripiperic Acid (2-[3 : 4-Methylenedioxyphenylethyl]-acrylic acid, 4-[3 : 4-methylenedioxyphenyl]-1-butylene-1-carboxylic acid)



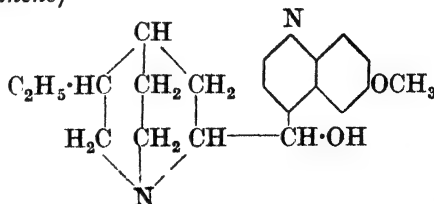
$C_{12}H_{12}O_4$

MW, 220

Needles from EtOH. M.p. 130–1°.

See previous reference.

Hydroquinidine (Hydroconquinine, hydroconchinene)



$C_{26}H_{26}O_2N_2$

MW, 326

Needles from EtOH. M.p. 168–9°. $[\alpha]_D^{25} + 229.6^\circ$.

B, HCl: cryst. from H_2O . M.p. 273–4°. $[\alpha]_D^{25} + 183.9^\circ$. Sol. MeOH, $CHCl_3$, EtOH, H_2O . Spar. sol. Me_2CO .

Rabe *et al.*, *Ber.*, 1931, 64, 2499.

Heidelberger, Jacobs, *J. Am. Chem. Soc.*, 1919, 41, 826.

Hydroquinine.

Stereoisomer of hydroquinidine (*above*). Constituent of most cinchona barks. Needles from Et_2O or $CHCl_3$. M.p. anhyd. 172.3° (169°). $[\alpha]_D^{20} - 142.2^\circ$ in EtOH. Easily sol. Et_2O , EtOH, $CHCl_3$, Me_2CO .

B, HCl: m.p. anhyd. 235–40°.

Benzoyl deriv.: cryst. M.p. 102–7°.

Methiodide: yellow prisms from EtOH. M.p. 233–5° decomp. after sintering at 170°. $[\alpha]_D^{20} - 107.6^\circ$.

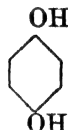
Heidelberger, Jacobs, *J. Am. Chem. Soc.*, 1919, 41, 819, 2101.

See also first reference above.

Hydroquinol.

See Hydroquinone.

Hydroquinone (*Hydroquinol*, *quinol*, 1:4-dihydroxybenzene)



$C_6H_6O_2$

MW, 110

Needles from H_2O . M.p. 170.3°. Dimorphous. Stable form from H_2O ; labile form on sublimation. B.p. 285°/730 mm. Very sol. hot H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 . Ox. \rightarrow quinhydrone \rightarrow *p*-benzoquinone.

Me ether: *p*-hydroxyanisole, *p*-methoxyphenol. $C_7H_8O_2$. MW, 124. Plates from H_2O . M.p. 53°. B.p. 243°. Reduces $NH_3 \cdot AgNO_3$. *Acetyl*: *p*-methoxyphenyl acetate. $C_9H_{10}O_3$. MW, 166. M.p. 31–2°. B.p. 243°/751 mm., 135°/18 mm. (Klemenc, *Monatsh.*, 1914, 35, 85).

Di-Me ether: 1:4-dimethoxybenzene. $C_8H_{10}O_2$. MW, 138. Plates. M.p. 56°. B.p. 212.5°, 109°/20 mm. $D_4^{25} 1.0526$, $D_4^{100} 1.0386$.

Et ether: *p*-hydroxyphenetole, *p*-ethoxyphenol. $C_8H_{10}O_2$. MW, 138. Prisms from H_2O . M.p. 66–7°. B.p. 246–7°.

Di-Et ether: 1:4-diethoxybenzene. $C_{10}H_{14}O_2$. MW, 166. Prisms. M.p. 71–2°. Very sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 .

Phenyl ether: see 4-Hydroxydiphenyl Ether.

Benzyl ether: *p*-Hydroxyphenyl benzyl Ether.

Diacetyl: plates from EtOH. M.p. 121° (123–4°). Very sol. Et_2O , $CHCl_3$, hot EtOH. Sol. hot H_2O .

Dibenzoyl: needles. M.p. 199°.

Nietzki, *Ann.*, 1882, 215, 127.

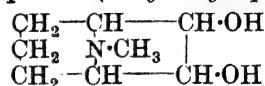
Hydroquinone-carboxylic Acid.

See Gentisic Acid.

Hydroquinone-dicarboxylic Acid.

See 3:6-Dihydroxyphthalic Acid and 2:5-Dihydroxyterephthalic Acid.

Hydroscopoline (*Dihydroxytropene*)



$C_8H_{15}O_2N$

MW, 157

Cryst. from Me_2CO -MeOH. M.p. 165°. Reduces $NH_3 \cdot AgNO_3$. $HI + P \rightarrow$ tropene.

B, HBr: m.p. 260° decomp.

Picrate: needles from EtOH. M.p. 232°.

Hess, Suchier, *Ber.*, 1915, 48, 2063.

Hess, *Ber.*, 1918, 51, 1011.

Hydrosorbic Acid (*2-Hexenic acid*, β -amylene- α -carboxylic acid, hexenoic acid, 2-pentene-1-carboxylic acid)



$C_6H_{10}O_2$

MW, 114

M.p. 12°. B.p. 208°, 103°/9–10 mm. $D_4^{25} 0.964$. $n_D^{25} 1.4365$. $k = 2.41 \times 10^{-5}$ at 25°.

Et ester: $C_8H_{14}O_2$. MW, 142. B.p. 166–7°, 64°/12 mm. $D_4^{20} 0.8957$. $n_D^{20} 1.4255$. Boiling alkalis \rightarrow 2-propylacrylic acid.

Chloride: C_6H_9OCl . MW, 132.5. B.p. 41–2°/12 mm.

Amide: $C_6H_{11}ON$. MW, 113. Plates from C_6H_6 . M.p. 60°.

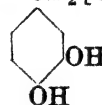
Nitrile: C_6H_9N . MW, 95. B.p. 103–4°/91 mm.

Anilide: needles. M.p. 55°.

Boxer, Linstead, *J. Chem. Soc.*, 1931, 748.

Kon, Linstead, MacLennan, *J. Chem. Soc.*, 1932, 2457.

Hydrothitsiol (3:4-Dihydroxy-1-heptadecyl benzene, 4-heptadecylcatechol)



$C_{23}H_{40}O_2$

MW, 348

Cryst. from xylene or pet. ether. M.p. 94–6°. B.p. 216–30°/0.18 mm.

Di-Me ether: $C_{25}H_{44}O_2$. MW, 376. Plates from EtOH. M.p. 56–7°.

Majima, *Ber.*, 1922, 55, 204.

Hydrothymoquinone.

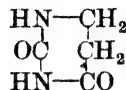
See Thymohydroquinone.

Hydrotoluquinone.

See Tolhydroquinone.

Hydrotropilidene. $\Delta^{1,3}$ -Cycloheptadiene, *q.v.*

Hydrouracil (β -Lactylurea, 2 : 4-diketohexahydro-1 : 3-diazine, 2 : 4-diketohexahydropyrimidine)



$\text{C}_4\text{H}_6\text{O}_2\text{N}_2$ MW, 114

Needles from H_2O . M.p. 275° . Very sol. EtOH. Sol. MeOH. Spar. sol. CHCl_3 , Me_2CO , AcOEt. Sol. 5 parts boiling H_2O .

Acetyl deriv.: $\text{C}_6\text{H}_8\text{O}_3\text{N}_2$. MW, 156. Needles from AcOEt. M.p. 180° . Very sol. hot EtOH, Et_2O . Sublimes.

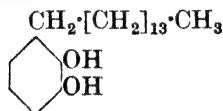
Osazone : m.p. $163-4^\circ$.

Tafel, Weinschenk, *Ber.*, 1900, **33**, 3385.

Gabriel, *Ber.*, 1905, **38**, 635.

Brown, Johnson, *J. Am. Chem. Soc.*, 1923, **45**, 2702.

Hydrourushiol (2 : 3-Dihydroxy-1-pentadecyl benzene, 3-pentadecylcatechol)



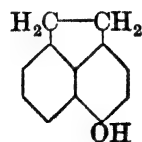
$\text{C}_{21}\text{H}_{36}\text{O}_2$ MW, 320

Needles from xylene or pet. ether. M.p. $58-59^\circ$. Very sol. EtOH, Et_2O , AcOH, CHCl_3 , C_6H_6 .

Di-Me ether : $\text{C}_{23}\text{H}_{40}\text{O}_2$. MW, 348. Prisms from EtOH. M.p. $36-7^\circ$.

Diacetyl : plates from MeOH. M.p. $50-1^\circ$.

Majima, Tahara, *Ber.*, 1915, **48**, 1606.

5-Hydroxyacenaphthene

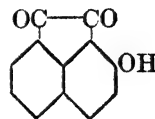
$\text{C}_{12}\text{H}_{10}\text{O}$ MW, 170

Needles from C_6H_6 . M.p. 126° . B.p. $221^\circ/40\text{ mm}$.

Baeyer D.R.P., 237,266, (*Chem. Zentr.*, 1911, II, 499).

3-Hydroxyacenaphthenequinone (1-Hydr-

oxyacenaphthenequinone. See numbering under Acenaphthene)



$\text{C}_{12}\text{H}_8\text{O}_3$ MW, 198

Me ether : 3-methoxyacenaphthenequinone. $\text{C}_{13}\text{H}_8\text{O}_3$. MW, 212. Yellow leaflets from AcOH. M.p. $215-16^\circ$. Spar. sol. Et_2O , C_6H_6 , EtOH. Red sol. in conc. H_2SO_4 .

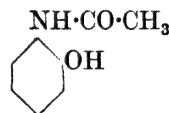
Et ether : 3-ethoxyacenaphthenequinone. $\text{C}_{14}\text{H}_{10}\text{O}_3$. MW, 226. Cryst. from AcOH. M.p. $141-2^\circ$. More sol. than Me ether.

Staudinger, Goldstein, Schlenker, *Helv. Chim. Acta*, 1921, **4**, 350.

Hydroxyacetaldehyde.

See Glycollic Aldehyde.

o-Hydroxyacetanilide (N-Acetyl-o-amino-phenol)



$\text{C}_8\text{H}_9\text{O}_2\text{N}$ MW, 151

Plates from EtOH.Aq. M.p. 209° (201°). Sol. EtOH, hot H_2O . $\text{FeCl}_3 \rightarrow$ green col.

O-Benzoyl : m.p. 140° .

Me ether : o-acetanisidide. See under o-Anisidine.

Et ether : o-acetphenetidide. See under o-Phenetidine.

Bamberger, *Ber.*, 1903, **36**, 2050.

Ladenburg, *Ber.*, 1876, **9**, 1526.

Bell, *J. Chem. Soc.*, 1931, 2962.

m-Hydroxyacetanilide (N-Acetyl-m-amino-phenol).

Needles from H_2O . M.p. $148-9^\circ$. Sol. H_2O , EtOH. Spar. sol. Et_2O , CHCl_3 , C_6H_6 .

Me ether : m-acetanisidide. See under m-Anisidine.

Et ether : m-acetphenetidide. See under m-Phenetidine.

Kehrmann, Dengler, *Ber.*, 1908, **41**, 3442.

Ikuta, *Am. Chem. J.*, 1893, **15**, 41.

p-Hydroxyacetanilide (N-Acetyl-p-amino-phenol).

Prisms from EtOH. M.p. 168° . Sol. hot H_2O , EtOH. Insol. cold H_2O . $\text{H}_2\text{SO}_4 + \text{HNO}_3 \rightarrow$ 2 : 6-dinitro-4-acetylaminophenol.

O-Acetyl : m.p. $150-1^\circ$.

Me ether : p-acetanisidide. See under p-Anisidine.

Et ether: *p*-acetphenetide. See under *p*-Phenetidine.

Phenacyl ether: see Hypnoacetin.

Friedländer, *Ber.*, 1893, **26**, 178.

Tingle, Williams, *Am. Chem. J.*, 1907, **37**, 63.

Vignolo, *Atti. accad. Lincei*, 1897, **6**, **1**, 71.

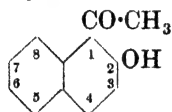
Hydroxyacetic Acid.

See Glycollic Acid.

3-Hydroxyacetoacetic Acid Lactone.

See Tetronic Acid.

2-Hydroxy-1-acetonaphthone (1-Aceto-2-naphthol, 2-hydroxy-1-acetylnaphthalene, methyl 2-hydroxy-1-naphthyl ketone)



$C_{13}H_{10}O_2$ MW, 186

Light yellow needles from pet. ether. M.p. 64°.

Me ether: $C_{13}H_{12}O_2$. MW, 200. M.p. 59°.

Hydrazone: m.p. 130°.

Fries, Schimmelschmidt, *Ber.*, 1925, **58**, 2835.

Fries, Frellstedt, *Ber.*, 1921, **54**, 712.

4-Hydroxy-1-acetonaphthone (4-Aceto-1-naphthol, 1-hydroxy-4-acetylnaphthalene, methyl 4-hydroxy-1-naphthyl ketone).

Pale yellow prisms from EtOH. M.p. 198°. Sol. alkalis, conc. H_2SO_4 .

Me ether: m.p. 72°.

Et ether: $C_{14}H_{14}O_2$. MW, 214. M.p. 78-9°.

Acetyl: m.p. 140°.

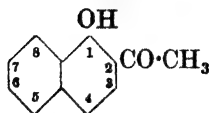
Oxime: m.p. 164°.

Phenylhydrazone: m.p. 133°.

Witt, v. Braun, *Ber.*, 1914, **47**, 3219.

Gattermann, Ehrhardt, Maisch, *Ber.*, 1890, **23**, 1208.

1-Hydroxy-2-acetonaphthone (2-Aceto-1-naphthol, 1-hydroxy-2-acetylnaphthalene, methyl 1-hydroxy-2-naphthyl ketone)



$C_{12}H_{10}O_2$ MW, 186

Exists in two cryst. forms. (1) Greenish yellow needles from EtOH. M.p. 103°. (2) Prisms from C_6H_6 or ligroin. M.p. 98°. B.p. 325° slight decomp. Sol. AcOH, $CHCl_3$, CS_2 , C_6H_6 . Spar. sol. EtOH. Insol. H_2O . Lower melting form is the more sol. Sol. alkalis and

conc. H_2SO_4 . All sols. are weakly yellow except in ligroin, which are colourless.

Me ether: $C_{13}H_{12}O_2$. MW, 200. M.p. 49°.

Et ether: $C_{14}H_{14}O_2$. MW, 214. B.p. 320°.

Acetyl: m.p. 107°.

Oxime: m.p. 168-9°.

Semicarbazone: m.p. 245-50°.

Witt, v. Braun, *Ber.*, 1914, **47**, 3219.

Friedländer, *Ber.*, 1895, **28**, 1946.

Ullmann, *Ber.*, 1897, **30**, 1466.

3-Hydroxy-2-acetonaphthone (3-Aceto-2-naphthol, 2-hydroxy-3-acetylnaphthalene, methyl 3-hydroxy-2-naphthyl ketone).

Needles from ligroin. M.p. 112°. Sol. alkalis, conc. H_2SO_4 .

Me ether: m.p. 48°.

Azine: m.p. 217°.

Fries, Schimmelschmidt, *Ber.*, 1925, **58**, 2835.

See also first reference above.

4-Hydroxy-2-acetonaphthone (3-Aceto-1-naphthol, 1-hydroxy-3-acetylnaphthalene, methyl 4-hydroxy-2-naphthyl ketone).

Needles from C_6H_6 . M.p. 173-4°. Sol. EtOH, AcOH. Sol. alkalis. Sol. conc. H_2SO_4 to orange sol. Ox. \rightarrow phthalic acid.

Acetyl: m.p. 108-9°.

Erdmann, Henke, *Ann.*, 1893, **275**, 292.

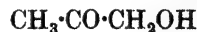
6-Hydroxy-2-acetonaphthone (6-Aceto-2-naphthol, 2-hydroxy-6-acetylnaphthalene, methyl 6-hydroxy-2-naphthyl ketone).

Prisms from C_6H_6 . M.p. 171°. Yellow sols. in alkalis. Ox. \rightarrow trimellitic acid.

Hydrazone: m.p. 295°.

Witt, v. Braun, *Ber.*, 1914, **47**, 3231.

Hydroxyacetone (*Acetol*, *acetylcarbinol*, *acetonyl alcohol*, *1-propanolone-2*, *pyroracemic alcohol*, *pyruvic alcohol*, *methyl hydroxymethyl ketone*, *2-ketopropyl alcohol*, *methylketol*)



$C_3H_6O_2$ MW, 74

F.p. about -17°. B.p. 145-6°, 105-6°/200 mm., 96-7°/150 mm., 54°/18 mm. D_4^{20} 1.0824. n_D^{20} 1.4295. Sol. H_2O , EtOH, Et_2O . Somewhat unstable; stabilised by MeOH. Reduces $NH_3 \cdot AgNO_3 \rightarrow$ *r*-lactic acid. Fehling's \rightarrow $H \cdot COOH + CH_3 \cdot COOH$. Gives bisulphite comp.

Me ether: see Methoxyacetone.

Et ether: see Ethoxyacetone.

Propyl ether: propyl acetonyl ether. $C_6H_{12}O_2$. MW, 116. B.p. 146°.

Isobutyl ether: isobutyl acetonyl ether. $C_7H_{14}O_2$. MW, 130. B.p. 157°/730 mm.

Isoamyl ether: isoamyl acetyl ether. $C_8H_{16}O_2$. MW, 144. B.p. $181^\circ/730$ mm.

Acetyl: see Acetoxyacetone.

Salicyloyl: see Salacetol.

Di-Et acetal: 1-hydroxy-2:2-diethoxypropane, 2:2-diethoxypropyl alcohol. $C_7H_{16}O_3$. MW, 148. B.p. $68^\circ/9$ mm. D_4^{20} 0.9618.

Oxime: m.p. 71° .

Semicarbazone: m.p. 196° .

Phenylhydrazone: m.p. 103° .

Perkin, *J. Chem. Soc.*, 1891, **59**, 787.

Levene, Walti, *Organic Syntheses*, 1930, **X**, 1.

Hildesheimer, *Ber.*, 1910, **43**, 2804.

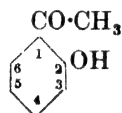
Nef, *Ann.*, 1904, **335**, 250.

Kling, *Ann. chim. phys.*, 1905, **5**, 496, 534.

ω -Hydroxyacetophenone.

See Phenacyl Alcohol.

***o*-Hydroxyacetophenone** (*o*-Acetophenol, *o*-acetylphenol, methyl 2-hydroxyphenyl ketone)



$C_8H_8O_2$

MW, 136

Present in oil from *Chione glabra*. Oil. B.p. $213^\circ/717$ mm., $106^\circ/17$ mm., $96^\circ/10$ mm. D_4^{20} 1.1307. n_D^{21} 1.558. Sol. EtOH, Et₂O, AcOH. Spar. sol. H₂O. FeCl₃ \rightarrow reddish-violet col.

Me ether: *o*-methoxyacetophenone, *o*-acetoanisole, methyl *o*-methoxyphenyl ketone. $C_9H_{10}O_2$. MW, 150. B.p. 245° , $131.2^\circ/18$ mm. $D_4^{23.6}$ 1.0849. $n_D^{23.5}$ 1.538. *Semicarbazone*: m.p. $182-3^\circ$. *Oxime*: needles. M.p. 83° . *Phenylhydrazone*: m.p. 114° .

Et ether: *o*-ethoxyacetophenone, *o*-aceto-phenetole, methyl *o*-ethoxyphenyl ketone. $C_{10}H_{12}O_2$. MW, 164. Plates from ligroin. M.p. 43° ($38.5-39.5^\circ$). B.p. $243-4^\circ$. Volatile in steam.

Acetyl: needles from EtOH. M.p. 89° . Sol. EtOH, Et₂O, AcOH. Insol. H₂O.

Oxime: m.p. 117° .

Semicarbazone: m.p. $209-10^\circ$.

Azine: m.p. 198° .

Phenylhydrazone: m.p. $109-10^\circ$.

Pauly, Lockemann, *Ber.*, 1915, **48**, 30.

Tahara, *Ber.*, 1892, **25**, 1308.

Eijkmann, Bergema, Henrard, *Chem.*

Zentr., 1905, **I**, 817.

Auwers, *Ann.*, 1915, **408**, 245.

Friedländer, Neudörfer, *Ber.*, 1897, **30**, 1080.

***m*-Hydroxyacetophenone** (*m*-Acetophenol, *m*-acetylphenol, methyl 3-hydroxyphenyl ketone).

Needles. M.p. 96° . B.p. 296° , $153^\circ/5$ mm. D^{100} 1.099. n_D^{100} 1.5348. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O. Insol. ligroin.

Me ether: *m*-methoxyacetophenone, *m*-acetoanisole, methyl *m*-methoxyphenyl ketone. Oil. B.p. 240° (252°), $125-6^\circ/12$ mm., $99^\circ/4$ mm. $D_4^{15.35}$ 1.0993. $n_D^{15.35}$ 1.5583. *Semicarbazone*: m.p. $195-7^\circ$.

Et ether: *m*-ethoxyacetophenone, *m*-aceto-phenetole, methyl *m*-ethoxyphenyl ketone. B.p. 255° .

Pfeiffer, *Ann.*, 1911, **383**, 104, 141.

Besthorn, Banzhof, Jaeglé, *Ber.*, 1894, **27**, 3036.

See also third reference above.

***p*-Hydroxyacetophenone** (*p*-Acetophenol, *p*-acetylphenol, methyl 4-hydroxyphenyl ketone).

Occurs in many natural glucosides. Needles from Et₂O or EtOH.Aq. M.p. 109° . B.p. $148^\circ/3$ mm. D^{100} 1.109. n_D^{100} 1.5577. FeCl₃ \rightarrow weak violet col. Na₂O₂ \rightarrow hydroquinone. CaO dist. \rightarrow phenol.

Me ether: *p*-methoxyacetophenone, *p*-acetoanisole, methyl *p*-methoxyphenyl ketone. Plates from Et₂O. M.p. $38-9^\circ$. B.p. 258° , $138-9^\circ/15$ mm. $D_4^{11.1}$ 1.0818. $n_D^{11.3}$ 1.547. *Semicarbazone*: m.p. $195-6^\circ$ ($181-2^\circ$). *Oxime*: needles from pet. ether. M.p. $86-7^\circ$.

Et ether: *p*-ethoxyacetophenone, *p*-aceto-phenetole, methyl *p*-ethoxyphenyl ketone. Plates from Et₂O. M.p. 39° ($36-7^\circ$).

Phenyl ether: 4-acetodiphenyl ether. $C_{14}H_{12}O_2$. MW, 212. Cryst. from EtOH.Aq. M.p. 45° . B.p. $318-25^\circ$.

Oxime: m.p. $144-5^\circ$.

Semicarbazone: m.p. $198-9^\circ$.

Klingel, *Ber.*, 1885, **18**, 2691.

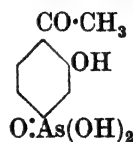
Pauly, Lockemann, *Ber.*, 1915, **48**, 30.

Eijkmann, Bergema, Henrard, *Chem.*

Zentr., 1905, **I**, 817.

Perkin, *J. Chem. Soc.*, 1897, **71**, 810.

o-Hydroxyacetophenone-*p*-arsinic Acid



$C_8H_8O_5As$

MW, 260

Needles from H₂O. M.p. 156° .

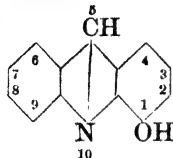
Gibson, Levin, *J. Chem. Soc.*, 1931, 2402.

Hydroxyacet-toluidide.

See under Aminocresol.

Hydroxy-acetylnaphthalene.

See Hydroxyacetonnaphthone.

1-Hydroxyacridine. (See note under Acridine) $C_{13}H_9ON$

MW, 195

Yellow needles from EtOH.Aq. M.p. 116.5°.

Me ether: $C_{14}H_{11}ON$. MW, 209. Light yellow needles from EtOH.Aq. M.p. 130-1°. *Picrate*: orange-red needles from EtOH. M.p. 250° decomp.*Picrate*: red needles from EtOH. M.p. 216°.Jensen, Rethwisch, *J. Am. Chem. Soc.*, 1928, 50, 1144.**3-Hydroxyacridine.**

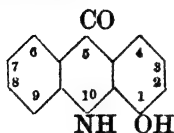
Yellow needles from EtOH. Does not melt below 250°.

Et ether: $C_{15}H_{13}ON$. MW, 223. Yellow plates from EtOH.Aq. M.p. 99°. *B,HCl*: yellow needles from EtOH. M.p. 200° decomp. *Picrate*: yellow needles from Me_2CO . Does not melt below 250°.

See above reference.

4-Hydroxyacridine.Yellow cryst. from EtOH. M.p. 117°. Sol. Et_2O . Sol. conc. H_2SO_4 with green fluor.*B,HCl*: orange needles. M.p. 252° decomp. $B_2H_2SO_4$: orange needles. M.p. 240°.*Picrate*: orange needles. M.p. 215°.*Et ether*: yellow needles. M.p. 80°. Sol. Et_2O , EtOH with bluish-green fluor. *B,HCl*: yellow needles. M.p. 220° decomp. $B_2H_2SO_4$: yellow needles. M.p. 250°. *Picrate*: yellow needles. M.p. 255°.Matsumura, *J. Am. Chem. Soc.*, 1927, 49, 810.**5-Hydroxyacridine.**

See Acridol.

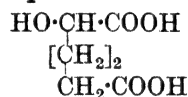
1-Hydroxyacridone $C_{13}H_9O_2N$

MW, 211

Yellow needles from AcOH.Aq. M.p. 300°. Sol. EtOH, AcOH with blue fluor. Spar. sol.

 C_6H_6 . Insol. ligroin. Sol. NaOH. Sol. conc. H_2SO_4 with green fluor.*Me ether*: $C_{14}H_{11}O_2N$. MW, 225. Yellow needles from AcOH.Aq. M.p. 293°. Sol. EtOH, AcOH. Spar. sol. C_6H_6 . Insol. ligroin.*Et ether*: $C_{15}H_{13}O_2N$. MW, 239. Yellow needles from AcOH.Aq. M.p. 320° decomp. Sol. EtOH, AcOH. Sol. conc. H_2SO_4 with green col.Ullmann, *Ann.*, 1907, 355, 345.Matsumura, *J. Am. Chem. Soc.*, 1927, 49, 810.**10-Hydroxyacridone (N-Hydroxyacridone).**Yellow needles from AcOH. M.p. 255-6°. Sol. conc. H_2SO_4 . Spar. sol. Et_2O , C_6H_6 , $CHCl_3$, $EtOH$, H_2O .*Me ether*: yellow needles from Me_2CO .Aq. M.p. 153°. Sol. Me_2CO , AcOH, EtOH, $CHCl_3$, C_6H_6 . Spar. sol. cold ligroin.Kliegl, Fehrlé, *Ber.*, 1914, 47, 1634.**2-Hydroxyacrylic Acid.**

See Formylacetic Acid.

1-Hydroxyadipic Acid $C_6H_{10}O_5$

MW, 162

Cryst. from H_2O . M.p. 151°. Sol. H_2O , EtOH, Et_2O . Sublimes.*Di-Me ester*: $C_8H_{14}O_5$. MW, 190. *Me ether*: $C_9H_{16}O_5$. MW, 204. B.p. 157-60°/11 mm.*Di-Et ester*: $C_{10}H_{18}O_5$. MW, 218. B.p. 160-1°/17 mm. *Me ether*: $C_{11}H_{20}O_5$. MW, 232. B.p. 142-4°/12 mm. *Acetyl deriv.*: b.p. 155-60°/12 mm.Ince, *J. Chem. Soc.*, 1895, 67, 159.Borsche, Manteuffel, *Ann.*, 1933, 505, 190.**2-Hydroxy- α -alanine.**

See Serine.

1-Hydroxy- β -alanine.

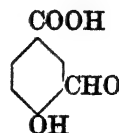
See Isoserine.

2-Hydroxy-1-aldehydoanthracene.

See 2-Anthrol-1-aldehyde.

2-Hydroxy-3-aldehydobenzoic Acid.

See 3-Aldehydosalicylic Acid.

4-Hydroxy-3-aldehydobenzoic Acid (4-Hydroxy-3-formylbenzoic acid, 4-hydroxyisophthalaldehydic acid) $C_8H_6O_4$

MW, 166

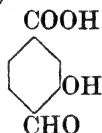
Prisms from H_2O . M.p. 244° . Sol. EtOH , Et_2O . Spar. sol. cold H_2O , CHCl_3 . Sublimes. Yellow sol. in NaOH . Aq. $\text{FeCl}_3 \rightarrow$ brick-red col. Ox. or KOH fusion \rightarrow 4-hydroxyisophthalic acid.

Phenylhydrazone: m.p. $257-8^\circ$ decomp.

Reimer, Tiemann, *Ber.*, 1876, 9, 1274.

Chattaway, Prats, *J. Chem. Soc.*, 1927, 690.

3-Hydroxy-4-aldehydobenzoic Acid (3-Hydroxy-4-formylbenzoic acid, 3-hydroxyterephthalaldehydic acid)



$\text{C}_8\text{H}_6\text{O}_4$

MW, 166

Needles. M.p. 234° . Sol. EtOH , Et_2O . Spar. sol. hot H_2O . Sublimes. Deep yellow sol. in NaOH . Aq. $\text{FeCl}_3 \rightarrow$ violet col. Ox. or KOH fusion \rightarrow hydroxyterephthalic acid.

See first reference above.

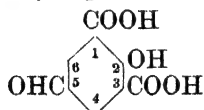
2-Hydroxy-5-aldehydobenzoic Acid.

See 5-Aldehydosalicic Acid.

4-Hydroxy-1-aldehydo-1:3-butadiene.

See Glutacondialdehyde.

2-Hydroxy-5-aldehydoisophthalic Acid (2-Hydroxy-5-formylisophthalic acid)



$\text{C}_9\text{H}_6\text{O}_6$

MW, 210

Needles. M.p. $237-8^\circ$ decomp. Sublimes without decomp. $\text{FeCl}_3 \rightarrow$ cherry-red col. Sols. shew blue fluor. (alk. sol. colourless). KOH fusion \rightarrow 2- and 4-hydroxyisophthalic acids. Ox. \rightarrow hydroxytrimesic acid.

Reimer, *Ber.*, 1878, 11, 795.

4-Hydroxy-5-aldehydoisophthalic Acid.

Needles from H_2O . M.p. 260° decomp. Sol. EtOH , Et_2O , hot H_2O . Spar. sol. cold H_2O . $\text{FeCl}_3 \rightarrow$ bluish-red col. KOH fusion \rightarrow 2- and 4-hydroxyisophthalic acids. Ox. \rightarrow hydroxytrimesic acid. Neutral alkali salt is colourless, basic is yellow. Both salts shew green fluor.

Reimer, *Ber.*, 1878, 11, 793.

Hydroxyaldehydoquinaldine.

See Hydroxyquinaldine-aldehyde.

Hydroxyaldehydoquinoline.

See Hydroxyquinoline-aldehyde.

Hydroxyallylene.

See Propargyl Alcohol.

Hydroxy-aldehydo-xylene.

See Hydroxydimethylbenzaldehyde.

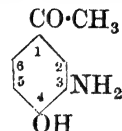
p-Hydroxy- ω -aminoacetophenone.

See p-Hydroxyphenacylamine.

ω -Hydroxy-aminoacetophenone.

See Aminophenacyl Alcohol.

4-Hydroxy-3-aminoacetophenone



$\text{C}_8\text{H}_9\text{O}_2\text{N}$

MW, 151

Me ether: $\text{C}_9\text{H}_{11}\text{O}_2\text{N}$. MW, 165. Prisms from EtOH . M.p. 102° . Sol. C_6H_6 . Mod. sol. Et_2O . *N-Acetyl*: prisms. M.p. 122.5° .

Bogert, Curtin, *J. Am. Chem. Soc.*, 1923, 45, 2164.

6-Hydroxy-3-aminoacetophenone (2-Hydroxy-5-aminoacetophenone).

Yellow needles or plates from H_2O . M.p. $121-2^\circ$ (110°). Sol. EtOH , Et_2O .

B,HCl: m.p. 155° decomp.

N-Acetyl: yellow cryst. from EtOH . M.p. 165° . Sol. EtOH . Spar. sol. Et_2O , CHCl_3 . *Na salt*: yellow plates. M.p. 225° decomp. *Oxime*: needles. M.p. 160° . *Phenylhydrazone*: m.p. 207° .

Diacetyl: m.p. $173-4^\circ$.

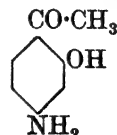
Oxime: m.p. $201-2^\circ$ decomp.

Et ether: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Yellow needles. M.p. 60° . Sol. EtOH . *B,HCl*: cryst. M.p. 215° . *N-Acetyl*: needles from EtOH . M.p. 155° .

Kunckell, *Ber.*, 1901, 34, 125; *Chem. Zentr.*, 1913, II, 2124.

Lindemann, Romanoff, *J. prakt. Chem.*, 1929, 122, 214.

2-Hydroxy-4-aminoacetophenone



$\text{C}_8\text{H}_9\text{O}_2\text{N}$

MW, 151

Plates from EtOH . Aq. M.p. $122-3^\circ$.

N-Acetyl: needles from EtOH or C_6H_6 . M.p. 91° .

N-Di-Me: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Plates

from ligroin. M.p. 120°. Alc. FeCl₃ → violet-black col.

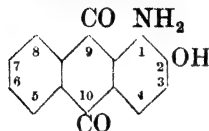
Gibson, Levin, *J. Chem. Soc.*, 1931, 2402.

Pechmann, Schaal, *Ber.*, 1899, 32, 3691.

Hydroxyaminoanthracene.

See Hydroxyanthramine.

2-Hydroxy-1-aminoanthraquinone



C₁₄H₉O₃N

MW, 239

Brown needles from EtOH. M.p. 250°. Very stable. Sol. aq. alkalis, alkali carbonates, Ba(OH)₂. HNO₃ in hot EtOH → 2-hydroxyanthraquinone.

N-Acetyl: dark brown cryst. from AcOH, golden needles from EtOH. M.p. 170°. Sol. alkalis.

Ether: C₁₆H₁₃O₃N. MW, 267. Red plates. M.p. 182°. Conc. H₂SO₄ at 200° → 2-hydroxy-1-aminoanthraquinone.

Liebermann, Troschke, *Ann.*, 1876, 183, 206.

Lagodzinski, *Ann.*, 1905, 342, 84.

Koehler, U.S.P., 1,922,480, (*Chem. Abstracts*, 1933, 27, 5083).

4-Hydroxy-1-aminoanthraquinone (1-Hydroxy-4-aminoanthraquinone, 4-aminoerythroxyanthraquinone).

Reddish-violet cryst. powder from EtOH.Aq. M.p. 207-8°. Sol. EtOH, C₆H₆ with reddish-brown col. Violet sol. in NaOH. Yellow sol. in conc. H₂SO₄.

N-Me: C₁₅H₁₁O₃N. MW, 253. Bronze cryst. Violet sols. in CHCl₃, AcOH. Yellow sol. in conc. HCl.

N-Di-Me: C₁₆H₁₃O₃N. MW, 267. Brownish-red needles from Py. M.p. 245°. Sol. CHCl₃. Orange-red sol. in conc. H₂SO₄ → bluish-red on addn. of boric acid.

N-Phenyl: 4-hydroxy-1-anilinoanthraquinone. C₂₀H₁₃O₃N. MW, 315. Blue-black needles from AcOH, dark violet needles from MeOH. M.p. 158° (153°). Sol. CHCl₃, AcOH. Spar. sol. EtOH. Green sol. in conc. H₂SO₄ → blue on addn. of boric acid.

Wacker, *Ber.*, 1902, 35, 3923.

Eckert, Steiner, *Monatsh.*, 1914, 35, 1144.

Bayer, D.R.P., 125,666, (*Chem. Zentr.*, 1901, II, 1190).

Koehler, U.S.P., 1,922,480, (*Chem. Abstracts*, 1933, 27, 5083).

5-Hydroxy-1-aminoanthraquinone (1-Hydroxy-5-aminoanthraquinone, 5-aminoerythroxyanthraquinone).

Brownish-red prisms from C₆H₆. M.p. 210° (216°). Sol. EtOH, C₆H₆. Spar. sol. H₂O. Sol. NaOH. Orange sol. in conc. H₂SO₄.

Wacker, *Ber.*, 1902, 35, 3925.

Höchst, D.R.P., 149,781, (*Chem. Zentr.*, 1904, I, 1045).

8-Hydroxy-1-aminoanthraquinone (1-Hydroxy-8-aminoanthraquinone, 8-aminoerythroxyanthraquinone).

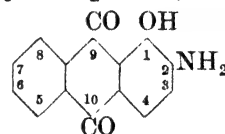
Brown needles from C₆H₆. M.p. 230° (214-15°). Sol. EtOH, C₆H₆. Sol. NaOH, Ba(OH)₂. HNO₃ in hot EtOH → 1-hydroxyanthraquinone.

N-Phenyl: phenyl ether, 8-phenoxy-1-anilinoanthraquinone. C₂₆H₁₇O₃N. MW, 391. Needles. M.p. 173-4°.

Schrobsdorff, *Ber.*, 1903, 36, 2936.

Höchst, D.R.P., 148,875, (*Chem. Zentr.*, 1904, I, 556).

1-Hydroxy-2-aminoanthraquinone (2-Aminoerythroxyanthraquinone)



C₁₄H₉O₃N

MW, 239

Brown needles from EtOH. M.p. 226-7°. Sol. Et₂O, EtOH, C₆H₆, Py. Sol. alkalis with bluish-violet col. Insol. H₂O. Sol. conc. H₂SO₄ with olive-green col. Hot alc. HNO₃ or H₃AsO₄ → 1-hydroxyanthraquinone. KOH fusion → alizarin.

N-Acetyl: red needles from EtOH or AcOH. M.p. 243-4°. Sol. Et₂O, EtOH, AcOH. Spar. sol. KOH.Aq.

N-Diacetyl: yellow cryst. M.p. 247-8°.

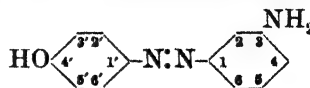
Brass, Zeigler, *Ber.*, 1925, 58, 755.

4-Hydroxy-2-aminoanthraquinone (1-Hydroxy-3-aminoanthraquinone, 3-aminoerythroxyanthraquinone).

Red needles. Does not melt below 310°. Sublimes.

Scholl, Schneider, Eberle, *Ber.*, 1904, 37, 4436.

4'-Hydroxy-3-aminoazobenzene



C₁₂H₁₁ON₂

MW, 213

Cryst. M.p. 168°.

N-Acetyl: red cryst. M.p. 208°.

Wallach, Schulze, *Ber.*, 1882, 15, 3021.

4'-Hydroxy-4-aminoazobenzene.

Cryst. M.p. 186°. Sol. EtOH. Orange sol. in conc. H₂SO₄.

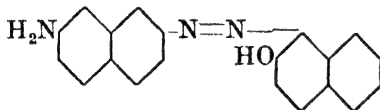
N-Di-Me: C₁₄H₁₅ON₃. MW, 241. Plates from EtOH. M.p. 203-4°. Dil. H₂SO₄ → red col. Me ether: C₁₅H₁₇ON₃. MW, 255. Prisms from Py or needles from EtOH. M.p. 161°. Acetyl deriv.: plates from EtOH. M.p. 137°.

N-Acetyl: plates from EtOH.Aq. M.p. 203° (198°). Acetyl deriv.: orange cryst. M.p. 236-7°.

Hewitt, Thomas, *J. Chem. Soc.*, 1909, 95, 1294.

Meldola, Williams, *Chem. News*, 1899, 80, 263.

2-Hydroxy-7'-amino-1:2'-azonaphthalene



C₂₀H₁₅ON₃

MW, 313

Cryst. from anisole. M.p. above 300°. Sol. Py, anisole. Spar. sol. EtOH, C₆H₆, xylene. Insol. dil. alkalis.

Kauffer, Karrer, *Ber.*, 1907, 40, 3263.

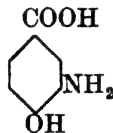
Hydroxy-o-aminobenzoic Acid.

See Hydroxyanthranilic Acid.

o-Hydroxy-aminobenzoic Acid.

See Aminosalicilic Acid.

4-Hydroxy-m-aminobenzoic Acid



C₇H₇O₃N

MW, 153

Prisms +1H₂O from H₂O. Loses H₂O at 100°. M.p. anhyd. 210°. Sol. hot AcOH, H₂O. Spar. sol. hot EtOH. Insol. Et₂O, CHCl₃, C₆H₆. Dist. → o-aminophenol.

Me ester: C₈H₉O₃N. MW, 167. Dimorphous. (1) Needles from C₆H₆ or AcOH. M.p. 142°. (2) Needles from CHCl₃. M.p. 110-11°. Sol. hot H₂O, EtOH, Et₂O. Spar. sol. C₆H₆. Local anæsthetic (Orthoform New). B,HCl: needles from EtOH. M.p. 225°. Sol. H₂O. B,HBr: needles from EtOH. M.p. 232°.

Me ether: 3-aminoanisic acid, 3-amino-p-methoxybenzoic acid. C₈H₉O₃N. MW, 167.

Needles from H₂O. M.p. 204°. Sol. hot EtOH, H₂O. Spar. sol. Et₂O, cold H₂O.

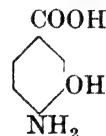
Et ether: 3-amino-p-ethoxybenzoic acid. C₉H₁₁O₃N. MW, 181. Cryst. M.p. 198-9°. Sol. hot EtOH, MeOH. Spar. sol. H₂O.

Einhorn, Pfyl, *Ann.*, 1900, 311, 43.

Einhorn, Ruppert, *Ann.*, 1902, 325, 305.

Auwers, Röhrig, *Ber.*, 1897, 30, 992.

3-Hydroxy-p-aminobenzoic Acid



C₇H₇O₃N

MW, 153

Plates from EtOH.Aq. M.p. 216°. Sol. EtOH, Me₂CO. FeCl₃ → dark-blue col. or brown ppt.

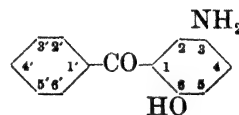
Me ester: C₈H₉O₃N. MW, 167. Plates from C₆H₆ or H₂O. M.p. 120-1°. Sol. Et₂O, EtOH, Me₂CO, C₆H₆. Spar. sol. H₂O. Insol. ligroin. FeCl₃ → brown col. Local anæsthetic (Orthoform Old).

Et ester: C₉H₁₁O₃N. MW, 181. Plates from CHCl₃-ligroin. Sol. Et₂O, EtOH, Me₂CO, C₆H₆. Spar. sol. H₂O, CHCl₃, ligroin. FeCl₃ → yellowish-brown col.

Einhorn, D.R.P., 97,335, (*Chem. Zentr.*, 1898, II, 526).

See also first reference above.

6-Hydroxy-3-aminobenzophenone (2-Hydroxy-5-aminobenzophenone)



C₁₃H₁₁O₂N

MW, 213

Plates from hot H₂O. M.p. 107°.

Gattermann, *Ber.*, 1896, 29, 3035.

4'-Hydroxy-2-aminobenzophenone.

Needles. M.p. 165°. Sol. EtOH. Spar. sol. Et₂O, C₆H₆.

Me ether: C₁₄H₁₃O₂N. MW, 227. Cryst from C₆H₆-pet. ether. M.p. 76°.

Stoermer, Gaus, *Ber.*, 1912, 45, 3106.

Ullmann, Bleier, *Ber.*, 1902, 35, 4278.

4'-Hydroxy-4-aminobenzophenone.

B,HCl: m.p. 167-70°.

Oxime: m.p. 164°.

Phenyl ether: 4-p-aminobenzoyldiphenyl ether. C₁₉H₁₅O₂N. MW, 289. M.p. 125°.

Dilthey, Blankenburg, Brandt, Huthwelker, *J. prakt. Chem.*, 1932, 135, 36.

2-Hydroxy-5-aminobenzyl Alcohol.

See 5-Aminosaligenin.

2-Hydroxy-1-aminobutyric Acid $\text{C}_4\text{H}_9\text{O}_3\text{N}$ MW, 119

Cryst. from 75% EtOH. M.p. 239° decomp.
Very sol. hot H_2O . Insol. EtOH, Et_2O , CHCl_3 .
Sol. 2.8 parts H_2O at 14°.

B.HCl: m.p. 147–8°.

N-Benzoyl: cryst. from EtOH–pet. ether.
M.p. 176°.

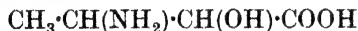
O:N-Dibenzoyl: cryst. from 30% EtOH.
M.p. 174°.

Egoroff, *Chem. Zentr.*, 1903, II, 554.Abderhalden, Heyns, *Ber.*, 1934, 67, 544.**3-Hydroxy-1-aminobutyric Acid** $\text{C}_4\text{H}_9\text{O}_3\text{N}$ MW, 119

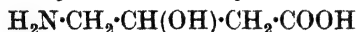
Needles from EtOH.Aq. M.p. 187° decomp.
(rapid heat.). Very sol. H_2O . Spar. sol. EtOH.
Insol. Et_2O . Passes readily into the lactone.

N-Benzoyl: needles from H_2O . M.p. 121°.Fischer, Blumenthal, *Ber.*, 1907, 40, 111.

Sørensen, Andersen, *Z. physiol. Chem.*,
1908, 56, 255, 273, 279.

1-Hydroxy-2-aminobutyric Acid (2-Methylisoserine) $\text{C}_4\text{H}_9\text{O}_3\text{N}$ MW, 119

Prisms from EtOH.Aq. M.p. 200° decomp.
Sol. to about 5% in H_2O at ord. temp. Spar.
sol. EtOH. Insol. Et_2O .

Neuberg, *Chem. Zentr.*, 1906, II, 166.**2-Hydroxy-3-aminobutyric Acid** $\text{C}_4\text{H}_9\text{O}_3\text{N}$ MW, 119*d.*M.p. 214°. $[\alpha]_D^{20} + 18.30^\circ$.

N-Benzoyl: m.p. 78–80° (+ H_2O), 116° (an-
hyd.). $[\alpha]_D^{20} + 10.0^\circ$ in H_2O .

*l.*M.p. 212° decomp. $[\alpha]_D^{20} - 20.98^\circ$.

N-Benzoyl: m.p. 80–1° (+ H_2O). 114° (an-
hyd.). $[\alpha]_D^{20} - 11.84^\circ$ in H_2O .

dl.

Cryst. from EtOH.Aq. M.p. 218°. Very sol.
hot H_2O . Spar. sol. cold H_2O and most org.
solvents. Neutral to litmus.

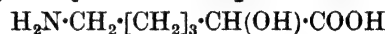
B.HBr: needles from H_2O . M.p. 78°.

N-Benzoyl: needles from H_2O . M.p. 176–7°.
Et ester: m.p. 99–100°. Sol. EtOH, Me_2CO ,
 C_6H_6 , AcOEt. Spar. sol. ligroin. *Amide*: prisms.
M.p. 130°. *Nitrile*: needles. M.p. 128–9°.

O-Benzoyl: hydrochloride, needles from H_2O .
M.p. 215° decomp.

Bergmann, Brand, Weinmann, *Z. physiol.*
Chem., 1923, 131, 1.

Tomita, Sendju, *Z. physiol. Chem.*, 1927,
169, 266.

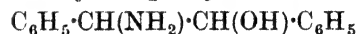
Bergmann, Lissitzin, *Ber.*, 1930, 63, 310.**1-Hydroxy-5-aminocaproic Acid** $\text{C}_6\text{H}_{13}\text{O}_3\text{N}$ MW, 147

Plates from EtOH. M.p. 225–30° decomp.
Very sol. H_2O . Spar. sol. MeOH, EtOH.

N-Benzoyl: prisms from H_2O . M.p. 108°.
Very sol. EtOH, Me_2CO . Spar. sol. Et_2O .

Fischer, Zemplén, *Ber.*, 1909, 42, 4889.

α -Hydroxy- β -aminodibenzyl (2-Hydroxy-
1:2-diphenylethylamine, 1-hydroxy-2-aminodi-
phenylethane, sym.-diphenylethanolamine)

 $\text{C}_{14}\text{H}_{15}\text{ON}$ MW, 213

Exists in two isomeric forms.

(1) Needles from EtOH. M.p. 165° decomp.
(161°). Sol. hot EtOH. Spar. sol. Et_2O . Insol.
 H_2O . Heat above m.p. \rightarrow benzylamine +
benzaldehyde.

B.HCl: decomp. at 234° (210°).*N-Formyl*: needles from EtOH. M.p. 182–3°.*N-Acetyl*: needles from EtOH. M.p. 196–7°.

O:N-Diacetyl: plates from EtOH. M.p. 212–
13°.

N-Benzoyl: needles. M.p. 236–7°.*O:N-Dibenzoyl*: plates. M.p. 254°.

(2) Isohydroxyaminodibenzyl, isodiphenyl-
oxyethylamine.

d.

Needles from C_6H_6 . M.p. 114°. $[\alpha]_D + 109.69^\circ$
in EtOH.

B.HCl: cryst. from EtOH. M.p. 228°. $[\alpha]_D$
+ 79.57° in H_2O .

O-Acetyl: m.p. 159°. $[\alpha]_D + 11.99^\circ$ in EtOH.
B.HCl: m.p. 196–7°.

N-Benzoyl: needles from EtOH. M.p. 215°.
 $[\alpha]_D + 29.63^\circ$ in MeOH.

l.

Cryst. from C_6H_6 . M.p. 114°. $[\alpha]_D - 109.66^\circ$
in EtOH.

B.HCl: cryst. from EtOH. M.p. 228°. $[\alpha]_D$
– 79.38° in H_2O .

O-Acetyl: m.p. 159°. $[\alpha]_D$ -12.39° in EtOH.
B,HCl: m.p. 196°.

N-Benzoyl: m.p. 214-15°. $[\alpha]_D$ -29.42° in MeOH.

dl.

Prisms from MeOH. M.p. 129-30°. Sol. C₆H₆, hot EtOH. Spar. sol. ligroin. HNO₃ → benzil. Heat above m.p. → benzylamine + benzaldehyde. Zn dust dist. → stilbene. HNO₂ → isohydrobenzoin.

B,HCl: plates from H₂O. M.p. 211°.

O-Acetyl: prisms from EtOH. M.p. 153°. B,HCl: m.p. 193°.

N-Benzoyl: needles from EtOH. M.p. 223°.

O:N-Dibenzoyl: cryst. from C₆H₆. M.p. 186-7°.

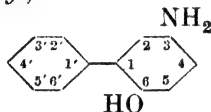
Erlenmeyer, jun., *Ber.*, 1897, **30**, 1525.

Söderbaum, *Ber.*, 1895, **28**, 2522.

Erlenmeyer, *Ber.*, 1899, **32**, 2378; *Ann.*, 1899, **307**, 114, 131.

Erlenmeyer, Arnold, *Ann.*, 1904, **337**, 307.

6-Hydroxy-3-aminodiphenyl (2-Hydroxy-5-aminodiphenyl)



C₁₂H₁₁ON

MW, 185

Needles from EtOH. M.p. 201° (199°). Sol. hot EtOH, C₆H₆. Spar. sol. Et₂O, CHCl₃. Insol. ligroin, H₂O. Ox. → 2-phenyl-*p*-benzoquinone.

B,HCl: cryst. M.p. 214°.

Borsche, Scholten, *Ber.*, 1917, **50**, 602.

Hill, Hale, *Am. Chem. J.*, 1905, **33**, 11.

2'-Hydroxy-4-aminodiphenyl.

Needles from toluene. M.p. 181-2°. Spar. sol. H₂O. Sol. alkalis. Warm FeCl₃ + HCl → red col.

Bamberger, *Ann.*, 1912, **390**, 161.

4'-Hydroxy-4-aminodiphenyl (4'-Hydroxy-xenylamine).

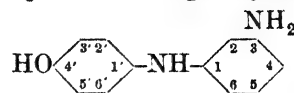
Plates from EtOH.Aq. M.p. 273°. Spar. sol. C₆H₆. Prac. insol. H₂O, Et₂O, Me₂CO. FeCl₃ + HCl → greenish-brown col. → violet on warming.

N-Acetyl: plates or prisms from EtOH.Aq. M.p. 225°. Sol. EtOH, alkalis. Insol. H₂O.

Täuber, *Ber.*, 1894, **27**, 2629.

Bamberger, *Ann.*, 1912, **390**, 152.

4'-Hydroxy-2-aminodiphenylamine



C₁₂H₁₂ON₂

MW, 200

Colourless needles from EtOH.Aq. M.p. 149.5°. Very sol. EtOH, AcOH, boiling C₆H₆. Spar. sol. boiling H₂O. Insol. ligroin.

Et ether: C₁₄H₁₆ON₂. MW, 228. Needles from EtOH.Aq. M.p. 95°.

Ullmann, Fukui, *Ber.*, 1908, **41**, 624.

Jacobson, Fertsch, Fischer, *Ber.*, 1893, **26**, 683.

4'-Hydroxy-4-aminodiphenylamine.

Plates from H₂O or toluene. M.p. 166°. Very sol. EtOH, AcOH, Me₂CO. Spar. sol. ligroin.

Diacetyl deriv.: plates from toluene. M.p. 141°.

Me ether: C₁₃H₁₄ON₂. MW, 214. Needles from ligroin. M.p. 102°. B.p. 238°/12 mm.

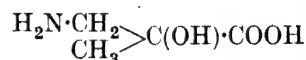
Et ether: needles from ligroin. M.p. 98-9°. Acetyl deriv.: needles from EtOH.Aq. M.p. 134°.

Ullmann, Jüngel, *Ber.*, 1909, **42**, 1080.

Jacobson, Henrich, Klein, *Ber.*, 1893, **26**, 693.

Willstätter, Kubli, *Ber.*, 1909, **42**, 4139.

1-Hydroxy-2-aminoisobutyric Acid (1-Methylisoserine, 1-aminomethyl-lactic acid)



C₄H₉O₃N

MW, 119

d.

Cryst. from EtOH.Aq. M.p. 230° decomp. Sol. H₂O, MeOH. Mod. sol. EtOH. $[\alpha]_D$ +4.34° in H₂O. Nitrosyl bromide in HBr → d-2-bromo-1-hydroxyisobutyric acid.

N-Benzoyl: needles from H₂O. M.p. 124°.

l.

Has similar properties to d-. $[\alpha]_D$ -4.15° in H₂O.

dl.

Plates from H₂O. M.p. 281° decomp. Sol. H₂O. Insol. EtOH, Me₂CO.

B,HCl: cryst. M.p. 132-4°. Hygroscopic.

Et ester: C₆H₁₃O₃N. MW, 147. Needles. M.p. 60°. B.p. 107°/15 mm. Sol. Et₂O, CHCl₃.

N-Me: needles from EtOH.Aq. M.p. 248°. Sol. H₂O. Spar. sol. EtOH. Insol. Et₂O, Me₂CO.

N-Di-Me: plates from EtOH-Me₂CO. M.p. 174°. Sol. H₂O, EtOH. Spar. sol. Me₂CO.

Insol. Et₂O. Hygroscopic. *Me ester*: b.p. 107°/35 mm.

N-Benzoyl: plates. M.p. 153°.

Kay, *Ann.*, 1908, **362**, 330.

Fourneau, *Bull. soc. chim.*, 1909, **5**, 230.

2-Hydroxy-1-aminoisopentane.

See 2-Hydroxy-2-methyl-*n*-butylamine.

4-Hydroxy-2-amino-2-methylpentane.

See Diacetonealkamine.

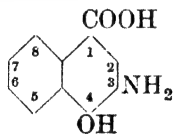
2-Hydroxy-4-amino-2-methylpentane.

See Dimethyl-2-aminopropylcarbinol.

1-Hydroxy-2-amino-4-methylpentane.

See 2-Amino-4-methyl-*n*-amyl Alcohol.

4-Hydroxy-3-amino-1-naphthoic Acid



C₁₁H₉O₃N

MW, 203

Cryst. M.p. 143° decomp. Sol. EtOH, Me₂CO. Spar. sol. hot H₂O → red col. FeCl₃ on alc. sol. → bluish-red col. Conc. HNO₃ → 1:2-naphthoquinone-4-carboxylic acid.

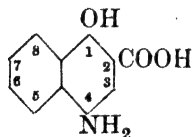
Heller, *Ber.*, 1912, **45**, 677.

3-Hydroxy-4-amino-1-naphthoic Acid.

Needles. M.p. 204° decomp. Hot dil. HCl → 1-amino-2-naphthol. Ox. → 1:2-naphthoquinone. HNO₃ → 1:2-naphthoquinone-4-carboxylic acid.

Lesser, *Gad, Ber.*, 1925, **58**, 2554.

1-Hydroxy-4-amino-2-naphthoic Acid



C₁₁H₉O₃N

MW, 203

Needles from AcOH. Insol. H₂O, EtOH, Et₂O, C₆H₆. Decomp. above 200° with loss of CO₂. Hot dry HCl → 4-amino-1-naphthol. HNO₃ → 1:4-naphthoquinone.

Me ether: C₁₂H₁₁O₃N. MW, 217. Brown needles from H₂O. M.p. 190–1° decomp. Insol. EtOH, AcOH, C₆H₆.

Nietzki, Guitermann, *Ber.*, 1887, **20**, 1276.

Froelicher, Cohen, *J. Chem. Soc.*, 1922, **121**, 1658.

3-Hydroxy-4-amino-2-naphthoic Acid.

Yellow prisms from EtOH. Decomp. at 205°. Sol. Me₂CO, EtOH, Et₂O. Spar. sol. C₆H₆.

CHCl₃. Hot dil. H₂SO₄ → 3:4-dihydroxy-2-naphthoic acid.

Me ester: C₁₂H₁₁O₃N. MW, 217. Yellow needles from MeOH. M.p. 106°. Hot dil. H₂SO₄ → 3:4-dihydroxy-2-naphthoic acid *Me ester*. Anaesthetic.

Möhlau, Kriebel, *Ber.*, 1895, **28**, 3091.

Gradenwitz, *Ber.*, 1894, **27**, 2623.

Weil, Heerdt, *Ber.*, 1922, **55**, 226.

3-Hydroxy-7-amino-2-naphthoic Acid.

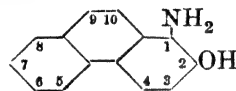
Yellow needles from EtOH.Aq. M.p. 230–2° (293°). Sol. EtOH, Et₂O, CHCl₃, AcOEt. Spar. sol. H₂O, C₆H₆. Insol. pet. ether. FeCl₃ → red col. H₂SO₄ → green col. Hot dil. H₂SO₄ → 3:7-dihydroxy-2-naphthoic acid.

Me ether: C₁₂H₁₁O₃N. MW, 217. Leaflets from Py. M.p. 310°. Sol. H₂O, EtOH, AcOH, Py. Insol. Et₂O, C₆H₆. *N-acetyl*: brown prisms from EtOH.Aq. M.p. 193°.

Froelicher, Cohen, *J. Chem. Soc.*, 1922, **121**, 1658.

Heyn, U.S.P., 1,754,390, (*Chem. Abstracts*, 1930, **24**, 2895).

2-Hydroxy-1-aminophenanthrene (1-Aminophenanthrol-2)



C₁₄H₁₁ON

MW, 209

Plates from EtOH. M.p. indefinite (darkens at 210°). Sol. EtOH. Spar. sol. Et₂O, C₆H₆.

B,HCl: needles from EtOH. M.p. 250° decomp. Sol. EtOH. Spar. sol. H₂O. H₂SO₄ → cherry-red col.

N-Acetyl: cryst. from PhNO₂. M.p. 295°.

Diacetyl deriv.: needles from C₆H₆. M.p. 227°.

Triacetyl: cryst. from ligroin. M.p. 122–3°.

Fieser, *J. Am. Chem. Soc.*, 1929, **51**, 1899.

9-Hydroxy-2-aminophenanthrene (2-Amino-9-phenanthrol).

White cryst. M.p. 194–5°. Very sol. EtOH. Very spar. sol. ligroin, CHCl₃, CCl₄.

N-Benzoyl: cryst. from EtOH. M.p. 160° decomp.

Schmidt, Spoun, *Ber.*, 1922, **55**, 1211.

10-Hydroxy-2-aminophenanthrene (2-Amino-10-phenanthrol).

Cryst. from EtOH. M.p. 221°.

O: *N-Diacetyl*: cryst. M.p. 182°.

O: *N-Dibenzoyl*: cryst. from EtOH. M.p. 225–6°.

Schmidt, Spoun, *Ber.*, 1922, **55**, 1210.

1-Hydroxy-4-aminophenanthrene (4-Aminophenanthrol-1).

Powder. Extremely sensitive to oxidation. Triacetyl deriv.: colourless plates. M.p. 143°. Readily sol. MeOH.

Fieser, *J. Am. Chem. Soc.*, 1929, **51**, 2469.

3-Hydroxy-4-aminophenanthrene (4-Aminophenanthrol-3).

Needles from EtOH. M.p. 159–61° (162°) decomp. Very sol. EtOH, Et₂O, Me₂CO, C₆H₆.

Triacetyl deriv.: needles from EtOH. M.p. 169–70°.

Werner, Löwenstein, Wack, Kunz, *Ann.*, 1902, **321**, 297.

Fieser, *J. Am. Chem. Soc.*, 1929, **51**, 945.

9-Hydroxy-10-aminophenanthrene (10-Amino-9-phenanthrol, morphigenin).

Yellowish-brown cryst. M.p. 417° after sintering at 150°.

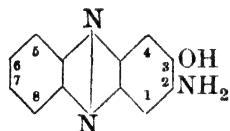
B.HCl: needles. M.p. above 290°.

N-Acetyl: needles. M.p. 223–4°.

O:N-Diacetyl: prisms. M.p. 242°.

N-Benzoyl: needles from AcOH. M.p. 248–9°.

Pschorr, *Ber.*, 1902, **35**, 2733.

3-Hydroxy-2-aminophenazine

C₁₂H₉ON₃

MW, 211

Yellow cryst. from EtOH. Spar. sol. hot PhNO₂. Brownish-red sol. in conc. H₂SO₄. 20% H₂SO₄ at 200° → 2:3-dihydroxyphenazine.

N-Acetyl: reddish-brown needles from EtOH. Does not melt below 340°. Spar. sol. C₆H₆. Red sol. in H₂SO₄.

Diacetyl deriv.: needles from toluene. M.p. 230°. Sol. EtOH.

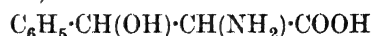
Ullmann, Mauthner, *Ber.*, 1902, **35**, 4303.

7-Hydroxy-2-aminophenazine.

Cryst. M.p. 360°. Sol. EtOH with green fluor. Insol. C₆H₆, ligroin. Conc. H₂SO₄ → violet col.

Diacetyl deriv.: yellow plates from PhNO₂. M.p. 275°. Spar. sol. EtOH. Insol. H₂O, C₆H₆.

Ullmann, Gnaedinger, *Ber.*, 1912, **45**, 3442.

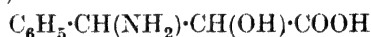
2-Hydroxy-1-amino-2-phenylpropionic Acid (2-Phenylserine, 1-amino-2-phenylhydracrylic acid)

C₉H₁₁O₃N

MW, 181

Plates + 1H₂O from EtOH.Aq. Decomp. at 193–4°. Sol. to 3% in H₂O at ord. temp. Spar. sol. EtOH, Et₂O.

Erlenmeyer, Früstück, *Ann.*, 1895, **284**, 41.

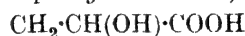
1-Hydroxy-2-amino-2-phenylpropionic Acid (2-Amino-2-phenyl-lactic acid, 2-phenyl-isoserine)

C₉H₁₁O₃N

MW, 181

Decomp. at 220–1°.

Erlenmeyer, *Ann.*, 1892, **271**, 155; *Ber.*, 1906, **39**, 792.

1-Hydroxy-2-p-aminophenylpropionic Acid (2-p-Aminophenyl-lactic acid)

C₉H₁₁O₃N

MW, 181

Needles from 93% EtOH. M.p. 189–90° decomp. Sol. EtOH. Insol. Et₂O.

Erlenmeyer, Lipp, *Ann.*, 1883, **219**, 231.

1-Hydroxy-2-aminopropionaldehyde (Iso-serine aldehyde, aminolactic aldehyde)

C₃H₇O₂N

MW, 89

Not known in free state. Polymerises easily. Reduces NH₃.AgNO₃ and Fehling's Br → isoserine.

B.HCl: needles. M.p. 137–47° decomp.

B₂H₂PtCl₆: m.p. 185° decomp.

d-.

Cryst. M.p. 42°. B.p. 107–10°/17 mm. [α]_D²⁵ +21.5° in H₂O. Hygroscopic.

l-.

Cryst. M.p. 42°. [α]_D²⁵ –20.5 in H₂O.

dl-.

Needles from AcOEt. M.p. 58°. B.p. 110–12°/12 mm. Hygroscopic.

Di-Et acetal: C₇H₁₇O₃N. MW, 163. B.p. 120–1°/14 mm. Sol. Et₂O.

Wohl, Schweitzer, *Ber.*, 1907, **40**, 97.

Wohl, Momber, *Ber.*, 1914, **47**, 3350.

2-Hydroxy-1-aminopropionic Acid.

See Serine.

1-Hydroxy-2-aminopropionic Acid.

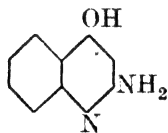
See Isoserine.

Hydroxy-aminopurine.

See Guanine and Isoguanine.

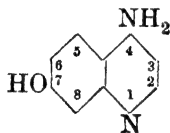
4-Hydroxy-2-aminopyrimidine.

See Isocytosine.

2-Hydroxy-6-aminopyrimidine.Cytosine, *q.v.***4-Hydroxy-2-aminoquinoline (2-Amino-4-quinolinol)** $C_9H_8ON_2$

MW, 160

Needles + $1H_2O$ from H_2O . Anhyd. rhombohedra from EtOH. M.p. 303–4°. Sol. HCl, alkalis. Spar. sol. EtOH. Forms cryst. chloroplatinate and chloroaurate.

Gabriel, *Ber.*, 1918, 51, 1509.**6-Hydroxy-4-aminoquinoline (4-Amino-6-quinolinol)** $C_9H_8ON_2$

MW, 160

Cryst. from EtOH. M.p. 264° decomp. Sol. MeOH, EtOH. Spar. sol. H_2O , AcOH, C_6H_6 . Insol. $CHCl_3$, Et_2O , pet. ether. Conc. H_2SO_4 → yellow sol. with blue fluor. HNO_3 → red sol.

Me ether: $C_{10}H_{10}ON_2$. MW, 174. Needles from C_6H_6 . M.p. 120°. *B,HCl*: m.p. 249°.

John, Andraschko, *J. prakt. Chem.*, 1930, 128, 209.**2-Hydroxy-5-aminoquinoline (5-Amino-carbostyryl).**Needles from H_2O . M.p. 250°.Claus, Setzer, *J. prakt. Chem.*, 1896, 53, 396.**6-Hydroxy-5-aminoquinoline (5-Amino-6-quinolinol).**

Green needles. M.p. 185°. Sol. EtOH. Spar. sol. Et_2O , C_6H_6 , $CHCl_3$. $FeCl_3$ → quinolinequinone.

Me ether: $C_{10}H_{10}ON_2$. MW, 174. Yellow plates from ligroin. M.p. 154–6°. *Picrate*: red needles from EtOH.Aq. M.p. 225°.

Et ether: $C_{11}H_{12}ON_2$. MW, 188. Yellow needles + $1H_2O$ from H_2O . M.p. 76°. M.p. anhyd. 115–16°. *N-Acetyl*: m.p. 163–4°. *N-Benzoyl*: m.p. 144°.

Zincke, Wiederhold, *Ann.*, 1896, 290, 364. Vis, *J. prakt. Chem.*, 1893, 48, 29.**8-Hydroxy-5-aminoquinoline (5-Amino-8-quinolinol).**

Needles from C_6H_6 . M.p. 143°. CrO_3 → quinolinequinone.

Me ether: yellow needles from EtOH. M.p. 156°. *N-Acetyl*: m.p. 179°. *N-Benzoyl*: m.p. 268–9°. *Picrate*: brown needles from H_2O . M.p. 126°.

Et ether: yellow plates + $1H_2O$. M.p. 70°. M.p. anhyd. 114°. Spar. sol. H_2O , EtOH. Insol. ligroin. *N-Benzoyl deriv.*: analgen. Yellow needles from EtOH. M.p. 206°. Spar. sol. H_2O . Antiseptic and antineuralgic.

N-Acetyl: prisms from EtOH. M.p. 221–2°. Insol. C_6H_6 , Me_2CO .

O:N-Diacetyl: plates from EtOH. M.p. 206–7°. *O:N-Dibenzoyl*: plates from EtOH. M.p. 205°.

Gattermann, *Ber.*, 1894, 27, 1939.Balaban, *J. Chem. Soc.*, 1932, 2625.Vis, *J. prakt. Chem.*, 1892, 45, 541.**2-Hydroxy-6-aminoquinoline (6-Amino-carbostyryl).**

Yellow plates from AcOH. Does not melt below 320°. Spar. sol. AcOH.

Me ether: $C_{10}H_{10}ON_2$. MW, 174. Plates from EtOH.Aq. M.p. 103°. Sol. EtOH, Et_2O . Mod. sol. H_2O .

Friedländer, Lazarus, *Ann.*, 1885, 229, 246.Feer, Königs, *Ber.*, 1885, 18, 2397.**8-Hydroxy-6-aminoquinoline (6-Amino-8-quinolinol).**

Me ether: m.p. 169° (168°). *Picrate*: orange needles from H_2O . M.p. 224°.

Balaban, *J. Chem. Soc.*, 1932, 2625.**2-Hydroxy-7-aminoquinoline (7-Amino-carbostyryl).**

Needles from H_2O . Does not melt below 250°. Sol. EtOH, H_2O . Forms cryst. salts with acids.

Friedländer, Fritsch, *Monatsh.*, 1902, 23, 538.**8-Hydroxy-7-aminoquinoline (7-Amino-8-quinolinol).**

Brown prisms from EtOH.Aq. M.p. 124°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. H_2O . *B,2HCl*: needles from EtOH. M.p. 256°.

5-Hydroxy-8-aminoquinoline

N-Acetyl: needles. M.p. 177°. Picrate: reddish-brown prisms from EtOH. M.p. 205° decomp.

Matsumura, *J. Am. Chem. Soc.*, 1927, 49, 814.

5-Hydroxy-8-aminoquinoline (8-Amino-5-quinolinol).

Cryst. Does not melt below 250°. Sol. alkalis.

N-Acetyl: leaflets from EtOH.Aq. M.p. 227° decomp. Spar. sol. H₂O, AcOH. Insol. C₆H₆, Me₂CO.

O: N-Diacetyl: needles from EtOH.Aq. M.p. 153-4°.

O: N-Dibenzoyl: prisms from AcOH. M.p. 180°.

Gattermann, *Ber.*, 1894, 27, 1940.

Jacobs, Heidelberger, *J. Am. Chem. Soc.*, 1917, 39, 2217.

6-Hydroxy-8-aminoquinoline (8-Amino-6-quinolinol).

Needles from EtOH.Aq. M.p. 185° C. Sol. EtOH. Spar. sol. Et₂O, C₆H₆, CHCl₃. FeCl₃ → quinolinequinone.

Me ether: C₁₀H₁₀ON₂. MW, 174. Cryst. M.p. 41°. B.p. 137-8°/1 mm. Antipyretic. B,HCl: needles. M.p. 228°.

Et ether: C₁₁H₁₂ON₂. MW, 188. Cryst. M.p. 60°. B.p. 144-5°/1 mm.

Mathëus, *Ber.*, 1888, 21, 1645, 1887.

Schulemann, Schönhöfer, Meitzsch, U.S.P., 1,703,365, (*Chem. Abstracts*, 1929, 23, 1995).

7-Hydroxy-8-aminoquinoline (8-Amino-7-quinolinol).

Me ether: yellow needles from EtOH.Aq. M.p. 108°. Picrate: red needles from EtOH.Aq. M.p. 226° decomp.

Balaban, *J. Chem. Soc.*, 1932, 2626.

3-Hydroxy-1-aminovaleric Acid



C₅H₁₁O₃N MW, 133

Leaflets from EtOH.Aq. M.p. 212° decomp. Sol. H₂O. Spar. sol. EtOH. P+HI → 1-aminovaleric acid.

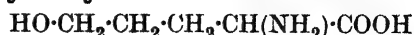
Lactone: C₈H₉O₃N. MW, 115. Oil. B.p. 123-5°/13 mm. B,HCl: prisms. M.p. 198-200°.

Fischer, Leuchs, *Ber.*, 1902, 35, 3797.

Diet. of Org. Comp.—II.

225 10-Hydroxyanthracene-1-carboxylic Acid

4-Hydroxy-1-aminovaleric Acid



C₅H₁₁O₃N MW, 133

Needles from MeOH.Aq. M.p. 223-4°. Sol. H₂O. Spar. sol. EtOH, Me₂CO. Insol. Et₂O, ligroin. Fusion → pyrrolidine-1-carboxylic acid.

Sörensen, *Chem. Zentr.*, 1905, II, 398.

1-Hydroxy-4-aminovaleric Acid (1-Hydroxyhomopiperidinic acid)



C₅H₁₁O₃N MW, 133

Prisms. M.p. 188-91° decomp. Sol. H₂O. Spar. sol. EtOH. Fusion → 3-hydroxypiperidone-2.

Fischer, Zemplén, *Ber.*, 1909, 42, 4882.

Hydroxyaminoxylene.

See Aminoxylene.

p-Hydroxy-tert.-amylbenzene.

See p-tert.-Amylphenol.

β-Hydroxy-β-amylhydrocinnamic Acid.

See 2-Hydroxy-2-phenylcaprylic Acid.

Hydroxyanisaldehyde.

See Isovanillin and under Resorcylic Aldehyde.

Hydroxyanistic Acid.

See Isovanillic Acid and under β-Resorcylic Acid.

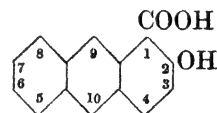
Hydroxyanisole.

See Guaiacol, and under Hydroquinone and Resorcinol.

Hydroxyanthracene.

See Anthrol.

2-Hydroxyanthracene-1-carboxylic Acid (2-Anthrol-1-carboxylic acid, 2-hydroxy-α-anthroic acid, 1-carboxy-2-anthrol)



C₁₅H₁₀O₃ MW, 238

Cryst. M.p. 263-5°.

I.G., D.R.P., 564,129, (*Chem. Abstracts*, 1933, 27, 1000).

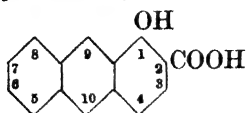
10 - Hydroxyanthracene - 1 - carboxylic Acid (9-Anthrol-4-carboxylic acid, 9-hydroxy-α-anthroic acid, 4-carboxy-ms-anthrol).

Cryst. from EtOH.Aq. M.p. 252-3°. Sol. EtOH, Et₂O. Ox. → anthraquinone-1-carboxylic acid.

Graebe, Juillard, *Ann.*, 1887, 242, 255.

1-Hydroxyanthracene-2-carboxylic Acid 226

1-Hydroxyanthracene-2-carboxylic Acid
(1-Anthrol-2-carboxylic acid, 1-hydroxy- β -anthroic acid, 2-carboxy-1-anthrol)



$C_{15}H_{10}O_3$

MW, 238

Cryst. M.p. 268°.

I.G., D.R.P., 559,333, (*Chem. Abstracts*, 1933, 27, 735); D.R.P., 564,129, (*Chem. Abstracts*, 1933, 27, 1000).

3-Hydroxyanthracene-2-carboxylic Acid
(2-Anthrol-3-carboxylic acid, 3-hydroxy- β -anthroic acid, 3-carboxy-2-anthrol).

M.p. above 300°.

See second reference above.

9-Hydroxyanthracene-2-carboxylic Acid
(9-Anthrol-2-carboxylic acid, 9-hydroxy- β -anthroic acid, 2-carboxy-*ms*-anthrol).

Yellow cryst. from EtOH.Aq. M.p. 305–10°. Sol. EtOH, AcOH. Spar. sol. Et₂O, C₆H₆. Alk. KMnO₄ → anthraquinone-2-carboxylic acid. Zn + NH₃ → anthracene-2-carboxylic acid.

Limpricht, *Ann.*, 1899, 309, 121.

Barnett, Cook, Grainger, *Ber.*, 1924, 57, 1779.

2-Hydroxy-1-anthramine (2-Hydroxy-1-aminoanthracene, 1-amino-2-anthrol)



$C_{14}H_{10}O$

MW, 194

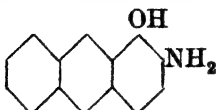
Plates from EtOH. Decomp. at 150°. Sol. EtOH, Et₂O. Spar. sol. CHCl₃. Conc. H₂SO₄ → yellow sol. with green fluor. → bluish-red on warming. Ox. → 1:2-anthraquinone.

N-Acetyl: plates from EtOH. Decomp. about 200–20°.

Triacetyl deriv.: plates from EtOH. M.p. 165°.

Lagodzinski, *Ann.*, 1905, 342, 73.

1-Hydroxy-2-anthramine (1-Hydroxy-2-aminoanthracene, 2-amino-1-anthrol)



$C_{14}H_{10}O$

MW, 194

5-Hydroxyanthranilic Acid

B,HCl: plates. FeCl₃ → 1:2-anthraquinone.

Triacetyl deriv.: plates or needles from AcOH. M.p. 161°. FeCl₃ → 1:2-anthraquinone.

Dienel, *Ber.*, 1906, 39, 930.

Hydroxyanthranil.

See Benzisoxazolone.

3-Hydroxyanthranilic Acid (3-Hydroxy-o-aminobenzoic acid)



$C_7H_7O_3N$

MW, 153

Leaflets from H₂O. M.p. 164°. Sol. hot H₂O, EtOH, Et₂O, CHCl₃. Spar. sol. cold H₂O.

B,HCl: cryst. from conc. HCl. M.p. 198–200°. Hyd. by H₂O.

Me ether: 3-methoxyanthranilic acid, 2-amino-m-methoxybenzoic acid. C₈H₉O₃N. MW, 167. Leaflets from AcOH. M.p. 170–1°. Acetyl: needles. M.p. 208°.

Keller, *Arch. Pharm.*, 1908, 246, 15, 21.

Froelicher, Cohen, *J. Chem. Soc.*, 1921, 119, 1431.

4-Hydroxyanthranilic Acid (4-Hydroxy-o-aminobenzoic acid).

The constitution of this acid is doubtful.

Needles. M.p. 148° decomp. Very sol. H₂O, EtOH, Et₂O. Spar. sol. CHCl₃, C₆H₆, toluene.

B,HCl: needles. Spar. sol. H₂O.

Me ether: 4-methoxyanthranilic acid, 2-amino-anisic acid. Plates from EtOH. M.p. 166° decomp. (172°). Very sol. EtOH, Me₂CO. Spar. sol. ligroin, CHCl₃, C₆H₆. Sols. show blue fluor. Me ester: C₉H₁₁O₃N. MW, 181. Needles. M.p. 75°. N-Acetyl: needles from MeOH. M.p. 199°.

Et ether: 4-ethoxyanthranilic acid, 2-amino-p-ethoxybenzoic acid. C₉H₁₁O₃N. MW, 181. Plates from EtOH. M.p. 174° decomp. Very sol. EtOH. Spar. sol. Et₂O, CHCl₃, ligroin, C₆H₆. N-Acetyl: plates. M.p. 182–3°.

Friedländer, Bruckner, *Deutsch. Ann.*, 1912, 388, 46.

Ullmann, Dootson, *Ber.*, 1918, 51, 20.

5-Hydroxyanthranilic Acid (5-Hydroxy-o-aminobenzoic acid).

Violet cryst. from H₂O. Darkens at 235°. M.p. 252° decomp. Sol. hot H₂O and most org. solvents. Spar. sol. cold H₂O. Sol. dil. acids and alkalis with blue fluor. Reduces NH₃. AgNO₃. FeCl₃ → reddish-brown col.

Me ester: $C_8H_9O_3N$. MW, 167. Yellow needles. M.p. 158°. *B,HCl*: cryst. from EtOH-AcOEt. M.p. 223°.

Et ester: $C_9H_{11}O_3N$. MW, 181. Cryst. from EtOH. M.p. 140°. *B,HCl*: m.p. 214°.

N-Acetyl: plates from H_2O . M.p. 227°.

Me ether: 5-methoxyanthranilic acid, 6-amino-*m*-methoxybenzoic acid. Needles from H_2O . M.p. 179–80°. Very sol. H_2O , Et_2O . *B,HCl*: m.p. 210°. *Acetyl*: m.p. 161–2°.

Et ether: 5-ethoxyanthranilic acid, 6-amino-*m*-ethoxybenzoic acid. M.p. 174°.

Puxeddu, *Gazz. chim. ital.*, 1929, **59**, 10, 489.

Gattermann, *Ber.*, 1894, **27**, 1932.

Friedländer, *Ber.*, 1916, **49**, 963.

6-Hydroxyanthranilic Acid (6-Hydroxy-*o*-aminobenzoic acid).

Free acid not known.

Me ether: 6-methoxyanthranilic acid, 6-amino-*o*-methoxybenzoic acid. $C_8H_9O_3N$. MW, 167. Needles from H_2O . M.p. 87°. *Amide*: $C_8H_{10}O_2N_2$. MW, 166. Needles from H_2O . M.p. 150°. *Nitrile*: $C_8H_8ON_2$. MW, 148. Needles from EtOH.Aq. M.p. 141°. *N-acetyl*, needles from EtOH. M.p. 176°.

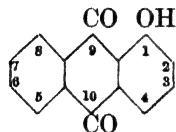
Et ether: 6-ethoxyanthranilic acid, 6-amino-*o*-ethoxybenzoic acid. *Amide*: $C_9H_{12}O_2N_2$. MW, 180. Needles from H_2O . M.p. 169°. *Nitrile*: $C_8H_{10}ON_2$. MW, 162. Needles from H_2O . M.p. 98.5°.

Friedländer, *Ber.*, 1916, **49**, 966.

Friedländer, Bruckner, Deutsch, *Ann.*, 1912, **388**, 42.

Roberts, Wiles, Kent, *J. Chem. Soc.*, 1932, 1795.

1-Hydroxyanthraquinone (α -Hydroxyanthraquinone, erythroxyanthraquinone)



$C_{14}H_8O_2$

MW, 224

Orange-red needles from EtOH. M.p. 193°. Sublimes without decomp. Sol. EtOH, Et_2O , C_6H_6 . Sol. alkalis to yellow sols. $HNO_3 \rightarrow$ phthalic acid. $NaNO_2 + \text{conc. } H_2SO_4 \rightarrow$ quinizarin. Oleum \rightarrow anthrarufin + 1:2:4:5:6:8-hexahydroxyanthraquinone. Gives insol. Ba salt.

Me ether: 1-methoxyanthraquinone. $C_{15}H_{10}O_3$. MW, 238. Yellow cryst. from EtOH. M.p.

170°. Sol. C_6H_6 , $CHCl_3$. Spar. sol. EtOH. *Oxime*: m.p. 198°.

Phenyl ether: 1-phenoxyanthraquinone. $C_{20}H_{12}O_3$. MW, 300. Cryst. M.p. 145°. Sublimes. Volatile in steam. *Oxime*: m.p. 175°.

p-Tolyl ether: $C_{21}H_{14}O_3$. MW, 314. Yellow needles from pet. ether. M.p. 128.5°.

1-Naphthyl ether: $C_{24}H_{14}O_3$. MW, 350. Yellow cryst. from pet. ether. M.p. 275–6°.

2-Naphthyl ether. Yellow cryst. from C_6H_6 . M.p. 180°.

Acetyl: needles. M.p. 176–9°.

Freund, Achenbach, *Ber.*, 1910, **43**, 3259.

Laube, *Ber.*, 1906, **39**, 2245.

Graebe, Bernhard, *Ann.*, 1906, **249**, 225.

2-Hydroxyanthraquinone (β -Hydroxyanthraquinone).

Occurs in roots of *Oldenlandia umbellata*. Yellow needles or plates from EtOH. Yellow needles from AcOH. M.p. 306° (302°). $k = 2.4 \times 10^{-8}$ at 18°. Sol. EtOH, Et_2O . Insol. cold H_2O . Sol. NH_4OH , alkalis to reddish-yellow sols. Sol. conc. H_2SO_4 to reddish-brown sol. $HI + P \rightarrow$ 2-anthrol. Gives sol. Ba salt.

Me ether: 2-methoxyanthraquinone. Yellow needles from EtOH. M.p. 195–6°. Begins to sublime at 100°. Sol. amyl alcohol, AcOH, C_6H_6 . Spar. sol. MeOH. Insol. H_2O . Sol. conc. $H_2SO_4 \rightarrow$ 2-hydroxyanthraquinone.

Et ether: 2-ethoxyanthraquinone. $C_{16}H_{12}O_3$. MW, 252. Yellow needles. M.p. 135°. Sol. EtOH. KOH fusion \rightarrow alizarin.

Phenyl ether: 2-phenoxyanthraquinone. Cryst. from EtOH-AcOEt. M.p. 153°. Sol. most org. solvents

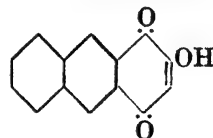
Acetyl: yellow needles from EtOH. M.p. 159°.

Liebermann, Haagen, *Ber.*, 1882, **15**, 1798.

Perkin, Hummel, *J. Chem. Soc.*, 1893, **63**, 1177.

Kauffer, *Ber.*, 1904, **37**, 65.

2-Hydroxyanthraquinone-1 : 4



$C_{14}H_8O_3$

MW, 224

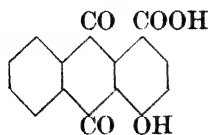
Dark yellow needles from EtOH. M.p. 235°. Sublimes without decomp. Sol. alkalis to yellow sols. Sol. conc. H_2SO_4 to red sol. Gives ppts. with $CaCl_2$, $BaCl_2$, $AgNO_3$.

Acetyl: yellow needles from EtOH. M.p. 188°.

Lagodzinski, *Ann.*, 1906, **344**, 91.

4-Hydroxyanthraquinone-1-carboxylic Acid

4-Hydroxyanthraquinone-1-carboxylic Acid

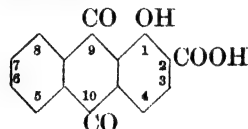


$C_{15}H_8O_5$ MW, 268

Yellow needles from H_2O . M.p. $236-8^\circ$ decomp. Sol. hot H_2O . Decomp. at $270^\circ \rightarrow$ 1-hydroxyanthraquinone + CO_2 .

Birukow, *Ber.*, 1887, 20, 2438.

1-Hydroxyanthraquinone-2-carboxylic Acid



$C_{15}H_8O_5$ MW, 268

Yellow needles from AcOH.Aq. M.p. $224-5^\circ$. Sol. usual org. solvents. Dark red sols in alkalis. Conc. $H_2SO_4 \rightarrow$ yellowish-red sol.

Phenyl ether: $C_{21}H_{12}O_5$. MW, 344. Yellow plates from ligroin. M.p. 272° .

2-Naphthyl ether: $C_{25}H_{14}O_5$. MW, 394. Yellow plates from AcOH. M.p. 262° .

Scholl, *Monatsh.*, 1913, 34, 1023.

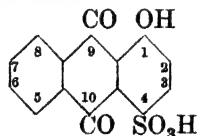
Badische, D.R.P., 251,696, (*Chem. Zentr.*, 1912, II, 1502).

5-Hydroxyanthraquinone-2-carboxylic Acid.

Me ether: $C_{16}H_{10}O_5$. MW, 282. Yellow needles from AcOH. M.p. 279° .

Eckert, *Monatsh.*, 1914, 35, 294.

1-Hydroxyanthraquinone-4-sulphonic Acid



$C_{14}H_8O_6S$ MW, 304

Needles from AcOH. M.p. 220° .

Na salt: reddish-brown plates. Spar. sol. H_2O .

NH₄ salt: reddish-brown plates. Spar. sol. H_2O .

Chloride: $C_{14}H_7O_6ClS$. MW, 322.5. Golden plates from $CHCl_3$. M.p. 246° . Sol. $CHCl_3$, AcOH, C_6H_6 . Conc. $H_2SO_4 \rightarrow$ violet sol.

Anilide: needles from AcOH. M.p. 199° .

Fries, Schürmann, *Ber.*, 1919, 52, 2188.

1-Hydroxyanthraquinone-5-sulphonic Acid.

2-Hydroxyanthraquinone-3-sulphonic Acid

Na salt: yellow needles. Sol. hot H_2O with yellow col. Spar. sol. excess NaOH. Conc. $H_2SO_4 \rightarrow$ orange sol. unchanged by boric acid.

Me ether: $C_{15}H_{10}O_6S$. MW, 318. *K salt*: yellow sol. in H_2O .

Phenyl ether: $C_{20}H_{12}O_6S$. MW, 380. *K salt*: yellow needles. Spar. sol. H_2O . Insol. Py.

Höchst, D.R.P., 158,413, (*Chem. Zentr.*, 1905, I, 704).

Bayer, D.R.P., 205,881, (*Chem. Zentr.*, 1909, I, 881).

1-Hydroxyanthraquinone-6-sulphonic Acid.

Na salt: yellow cryst. Heat with lime under press. \rightarrow 1:6-dihydroxyanthraquinone.

Me ether: $C_{15}H_{10}O_6S$. MW, 318. *Na salt*: yellowish-brown powder. Sol. $H_2O \rightarrow$ brown col. \rightarrow yellow with dil. min. acids. Conc. $H_2SO_4 \rightarrow$ deep yellow sol.

Phenyl ether: $C_{20}H_{12}O_6S$. MW, 380. *NH₄ salt*: plates. *Na salt*: long needles. Insol. Py. Conc. $H_2SO_4 \rightarrow$ orange sol. \rightarrow yellow on heating.

Höchst, D.R.P., 145,188, (*Chem. Zentr.*, 1903, II, 1037).

Bayer, D.R.P., 158,531, (*Chem. Zentr.*, 1905, I, 1517).

Frobenius, Hepp, *Ber.*, 1907, 40, 1048.

1-Hydroxyanthraquinone-7-sulphonic Acid.

Me ether: $C_{15}H_{10}O_6S$. MW, 318. *Na salt*: yellowish-brown powder.

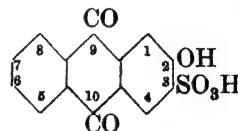
See first reference above.

1-Hydroxyanthraquinone-8-sulphonic Acid.

Na salt: cryst. Sol. hot H_2O , insol. cold. Sols. in alkalis. Excess alkali ppts. neutral salt. Conc. $H_2SO_4 \rightarrow$ reddish-yellow sol.

Bayer, D.R.P., 197,607, (*Chem. Zentr.*, 1908, I, 1814).

2-Hydroxyanthraquinone-3-sulphonic Acid



$C_{14}H_8O_6S$ MW, 304

Cryst. Sol. EtOH. Spar. sol. H_2O . Insol. Et₂O.

Na salt: needles + $1H_2O$ from EtOH.Aq.

Ba salt: yellowish-red cryst.

Perger, *J. prakt. Chem.*, 1878, 18, 179.

Georgievics, *Chem. Zentr.*, 1905, I, 1515.

2-Hydroxyanthraquinone-6-sulphonic Acid.

Acid Na salt: cryst. from H_2O . Yellow sol. in hot H_2O . Spar. sol. EtOH . Insol. Et_2O , C_6H_6 .

Neutral Na salt: red cryst.

Höchst, D.R.P., 106,505, (*Chem. Zentr.*, 1900, I, 741).

2-Hydroxyanthraquinone-7-sulphonic Acid.

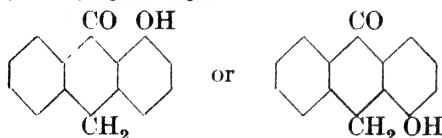
Acid Na salt: yellowish-red cryst.

Neutral Na salt: dark red cryst.

See above reference.

Hydroxyanthroic Acid.

See Hydroxyanthracene-carboxylic Acid.

1-(or 4-)Hydroxyanthrone

$\text{C}_{14}\text{H}_{10}\text{O}_2$

MW, 210

Yellow needles or plates from C_6H_6 . M.p. $133-5^\circ$. Sol. C_6H_6 , CS_2 , EtOH , AcOH , Py .

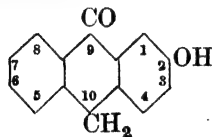
Me ether: $\text{C}_{15}\text{H}_{12}\text{O}_2$. MW, 224. Yellow cryst. M.p. 105° .

Liebermann, Mamlock, *Ber.*, 1905, **38**, 1794.

Graebe, Bernhard, *Ann.*, 1906, **349**, 224.

Höchst, D.R.P., 242,053, (*Chem. Zentr.*, 1912, I, 305).

Bayer, D.R.P., 301,452, (*Chem. Zentr.*, 1917, II, 715).

2-Hydroxyanthrone

$\text{C}_{14}\text{H}_{10}\text{O}_2$

MW, 210

Yellow needles from EtOH . M.p. 221° . Sol. EtOH , C_6H_6 , hot AcOH . Spar. sol. CHCl_3 .

Bistrzycki, Schepper, *Ber.*, 1898, **31**, 2793.

3-Hydroxyanthrone.

Needles from EtOH . Aq. M.p. $202-6^\circ$. Sol. EtOH , Et_2O .

Liebermann, Simon, *Ann.*, 1882, **212**, 28.

10-Hydroxyanthrone.

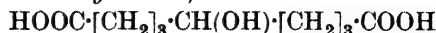
See Oxanthranol.

1-Hydroxyarachidic Acid.

See 1-Hydroxyeicosanic Acid.

 β -Hydroxyatropic Acid.

See Phenylformylacetic Acid.

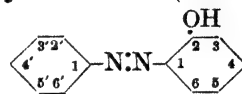
4-Hydroxyazelaic Acid (4-Hydroxyheptane-1:7-dicarboxylic acid)

$\text{C}_9\text{H}_{16}\text{O}_5$

MW, 204

Leaflets from CHCl_3 . M.p. $104-5^\circ$. Sol. H_2O , EtOH , hot CHCl_3 . Spar. sol. Et_2O , hot C_6H_6 . $\text{HI} \rightarrow$ azelaic acid.

v. Pechmann, Sidgwick, *Ber.*, 1904, **37**, 3820.

2-Hydroxyazobenzene (o-Benzeneazophenol)

$\text{C}_{12}\text{H}_{10}\text{ON}_2$

MW, 198

Orange red needles from Et_2O . M.p. 83° . Sol. most org. solvents. Spar. sol. H_2O . Sol. alkalis to orange-red sols. Volatile in steam. $\text{Zn} + \text{NH}_3 \rightarrow o$ -aminophenol + aniline.

Me ether: 2-methoxyazobenzene, *o*-benzeneazoisole. $\text{C}_{13}\text{H}_{12}\text{ON}_2$. MW, 212. Orange-red needles from EtOH . Aq. M.p. 41° . B.p. $196-7/14$ mm. Volatile in steam.

Et ether: 2-ethoxyazobenzene, *o*-benzeneazophenetole. $\text{C}_{14}\text{H}_{14}\text{ON}_2$. MW, 226. Purple prisms from pet. ether. M.p. 44° . Very sol. org. solvents.

Acetyl: orange-red liq. M.p. -20° .

Benzoyl: orange-red needles from pet. ether. M.p. 93° .

Cu deriv.: needles from EtOH . M.p. $225-6^\circ$.

Bamberger, *Ber.*, 1900, **33**, 3192; 1902, **35**, 1610.

Tietze, *Chem. Zentr.*, 1899, II, 583.

McPherson, Lucas, *J. Am. Chem. Soc.*, 1909, **31**, 283.

3-Hydroxyazobenzene (m-Benzeneazo-phenol).

Yellow prisms from C_6H_6 . M.p. $114-17^\circ$. Sol. EtOH , Et_2O , C_6H_6 . Spar. sol. H_2O , ligroin. Sol. dil. alkalis, conc. H_2SO_4 to orange-red sols. $\text{Zn} + \text{NH}_3 \rightarrow m$ -aminophenol + aniline.

Me ether: 3-methoxyazobenzene, *m*-benzeneazoisole. Red plates from MeOH . M.p. $32-3^\circ$. B.p. $193/15$ mm. Sol. org. solvents.

Et ether: 3-ethoxyazobenzene, *m*-benzeneazophenetole. Plates. M.p. 64° . B.p. $200/22$ mm.

Acetyl: orange plates from pet. ether. M.p. 67.5° .

Benzoyl: orange-red plates from pet. ether. M.p. 92° .

Jacobson, Hönigsberger, *Ber.*, 1903, **36**, 4102.

4-Hydroxyazobenzene (*p*-Benzeneazo-phenol).

Orange prisms from EtOH. M.p. 152°. B.p. 220–30°/20 mm. Sol. EtOH, Et₂O. Spar. sol. hot H₂O. Sol. dil. alkalis, conc. H₂SO₄ to yellow sols. $k = 4.9 \times 10^{-9}$. Heat of comb. C₉ 1508.5 Cal., C_p 1509.1 Cal. Reacts acid to litmus. Forms addn. comps. with amino-acids. Zn + NH₃ → *p*-aminophenol + aniline. HNO₃ → 2:4-dinitrophenol.

B,HCl: red needles. M.p. 169° decomp. Hyd. by H₂O.

B,2HNO₃: red leaflets. M.p. 75° decomp.

Me ether: 4-methoxyazobenzene, *p*-benzeneazobenzene. Brownish-yellow cryst. from pet. ether. M.p. 54–6°. B.p. 340°. Sol. most org. solvents.

Et ether: 4-ethoxyazobenzene, *p*-benzeneazobenzene. M.p. 85°. B.p. 339–40°. Sol. most org. solvents.

Propyl ether: C₁₅H₁₈ON₂. MW, 240. Dark orange needles. M.p. 61°.

Phenyl ether: 4-phenoxyazobenzene. C₁₈H₁₄ON₂. MW, 274. Golden leaflets. M.p. 116°.

Benzyl ether: C₁₉H₁₆ON₂. MW, 288. Golden needles. M.p. 116°.

Acetyl: yellow leaflets from EtOH. M.p. 89° (84–5°).

Propionyl: red needles. M.p. 75°.

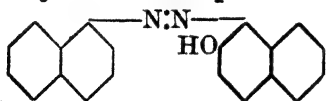
Benzoyl: yellow leaflets from EtOH. M.p. 136–8°.

Oddo, Puxeddu, *Ber.*, 1905, **38**, 2755.

Auwers, Eisenlohr, *Ann.*, 1909, **369**, 242.

Gorke, Köppe, Staiger, *Ber.*, 1908, **41**, 1157.

Ponizio, *Gazz. chim. ital.*, 1913, **43**, 560.

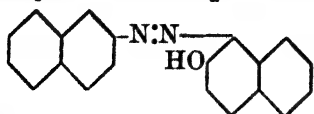
2-Hydroxy-1:1'-azonaphthalene

C₂₀H₁₄ON₂ MW, 298

Red needles. M.p. 229–30°. Spar. sol. EtOH. Insol. H₂O, alkalis, dil. acids. Violet sol. in conc. H₂SO₄.

Kunz, *Ber.*, 1898, **31**, 1531.

Meldola, Hanes, *J. Chem. Soc.*, 1894, **65**, 837.

2-Hydroxy-1:2'-azonaphthalene

C₂₀H₁₄ON₂ MW, 298

Reddish-brown needles from EtOH–aniline. M.p. 178–9°. Sublimes. Reddish-violet sol. in conc. H₂SO₄.

Acetyl: plates. M.p. 117°.

Nietzki, Goll, *Ber.*, 1886, **19**, 1282.

Meldola, Hanes, *J. Chem. Soc.*, 1894, **65**, 836.

5-Hydroxybarbituric Acid.

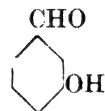
See Dialuric Acid.

1-Hydroxybehenic Acid.

See Phellonic Acid.

***o*-Hydroxybenzaldehyde.**

See Salicylaldehyde.

***m*-Hydroxybenzaldehyde** (*m*-Aldehyde-phenol)

C₇H₆O₂

MW, 122

Occurs naturally combined in glucoside salinigrin. Needles from hot H₂O. M.p. 108°. B.p. 240°, 191°/50 mm., 161°/20 mm. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. Insol. ligroin. Solid salts are colourless, but in sol. are yellow. $k = 1.0 \times 10^{-8}$ at 25°. Non-volatile in steam. FeCl₃ → weak violet col. Pptes. lead acetate. Zn + HCl → *m*-cresol. KOH fusion → *m*-hydroxybenzoic acid.

Me ether: *see m*-Methoxybenzaldehyde.

Et ether: *m*-ethoxybenzaldehyde. C₉H₁₀O₂. MW, 150. B.p. 245°, 151°/50 mm., 133°/16 mm. D₄²⁰ 1.0768. n_D^{20} 1.5408. Volatile in steam.

Acetyl: b.p. 203°.

Oxime: cryst. from hot C₆H₆. M.p. 87–8°. After melting the oxime on recryst. has m.p. 138°. Sol. H₂O, EtOH, Et₂O. Spar. sol. CHCl₃. Insol. ligroin. *B,HCl*: m.p. 140°. *Acetyl*: m.p. 122°.

Hydrazone: m.p. 104–5°.

Phenylhydrazone: m.p. 130°.

2:4-Dinitrophenylhydrazone: prisms from xylene. M.p. 259°.

Azine: m.p. 162°.

Phenylurethane: m.p. 158–60°.

Tiemann, Ludwig, *Ber.*, 1882, **15**, 2045.

Subak, *Monatsh.*, 1903, **24**, 167.

Werner, *Ber.*, 1895, **28**, 2001.

Dollfus, *Ber.*, 1892, **25**, 1912.

Clemm, *Ber.*, 1891, **24**, 826.

Pauly, Schübel, Lockemann, *Ann.*, 1911, **383**, 308.

Franzen, Eichler, *J. prakt. Chem.*, 1910, **82**, 246.

p-Hydroxybenzaldehyde (p-Aldehyde-phenol).

Occurs naturally combined in many glucosides. Needles from H_2O . M.p. $115-16^\circ$. Sublimes. Sol. hot H_2O , EtOH, Et₂O. Spar. sol. cold H_2O . n_D^{130} 1.5705. Heat of comb. C_7 793.07 Cal., C_p 793.3 Cal. $k = 2.2 \times 10^{-8}$ at 25° . Non-volatile in steam. $\text{FeCl}_3 \rightarrow$ weak violet col. KOH fusion \rightarrow p-hydroxybenzoic acid. $\text{Na}_2\text{O}_2 \rightarrow$ hydroquinone. $\text{NaHg} \rightarrow$ 4:4'-dihydroxybenzoin. $\text{Zn} + \text{HCl} \rightarrow$ p-cresol. Does not give Cannizzaro reaction. $\text{HBr} \rightarrow$ a comp., m.p. 185° ; $\text{CCl}_3\text{COOH} \rightarrow$ a comp., m.p. 68° .

Me ether: see Anisaldehyde.

Et ether: p-ethoxybenzaldehyde. M.p. $13-14^\circ$. B.p. 249° , $140^\circ/20$ mm. D_{21}^{21} 1.08. Anti-oxime: m.p. 118° . Syn-oxime: m.p. 157° .

Phenyl ether: 4-aldehydodiphenyl ether, p-phenoxybenzaldehyde. $\text{C}_{13}\text{H}_{10}\text{O}_2$. MW, 198. B.p. $191-3^\circ/22$ mm. Oxime: m.p. 86° .

Benzyl ether: p-aldehydophenyl benzyl ether. $\text{C}_{14}\text{H}_{12}\text{O}_2$. MW, 212. Needles from EtOH.Aq. M.p. 72° . Sol. EtOH, Et₂O, CHCl_3 , C_6H_6 . Spar. sol. H_2O . Oxime: m.p. $110-12^\circ$.

Acetyl: liq. at -21° . B.p. 265° . Anti-oxime: m.p. $114-15^\circ$. Syn-oxime: m.p. 132° .

Oxime: m.p. $72-3^\circ$, 112° anhyd. *B,HCl*: m.p. $160-5^\circ$. *Acetyl*: m.p. $114-15^\circ$.

Semicarbazone: needles from EtOH. M.p. $223-5^\circ$.

Hydrazone: needles from C_6H_6 . M.p. 222° .

Azine: m.p. $239-40^\circ$.

Di-Me acetal: m.p. $60-4^\circ$.

Cyanhydrin: see under 4-Hydroxymandelic Acid.

Herzfeld, Tiemann, *Ber.*, 1877, 10, 64.

Gattermann, Berchermann, *Ber.*, 1898, 31, 1766.

Gattermann, *Ann.*, 1907, 357, 347.

Tiemann, *Ber.*, 1886, 19, 357.

v. Kostanecki, Schneider, *Ber.*, 1896, 29, 1892.

Hantzsch, *Z. physik. Chem.*, 1894, 13, 518.

Brady, Dunn, *J. Chem. Soc.*, 1914, 105, 821.

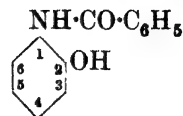
See also fourth, sixth, and seventh references above.

Hydroxybenzaldehyde-carboxylic Acid.

See Hydroxyaldehydobenzoic Acid and Aldehydosalicic Acid.

Hydroxybenzamide.

See under Hydroxybenzoic Acid and Salicylic Acid.

o-Hydroxybenzanilide (N-Benzoyl-o-amino-phenol)

$\text{C}_{13}\text{H}_{11}\text{O}_2\text{N}$

MW, 213

Leaflets. M.p. 167° decomp. Sol. EtOH, AcOH, C_6H_6 , Me_2CO , alkalis. Mod. sol. hot H_2O . Insol. ligroin.

Me ether: benzoyl-o-anisidine, benz-o-anisidine. $\text{C}_{14}\text{H}_{13}\text{O}_2\text{N}$. MW, 227. M.p. 60° . Sol. EtOH, Et₂O.

O-Acetyl: needles from EtOH. M.p. $134-40^\circ$.

O-Benzoyl: needles from EtOH. M.p. 185° . Sol. Me_2CO , CHCl_3 , C_6H_6 . Spar. sol. EtOH, ligroin.

O-m-Nitrobenzoyl: m.p. 152° .

Ciamician, Silber, *Ber.*, 1905, 38, 1181.

Hübner, *Ann.*, 1881, 210, 387.

Mühlhäuser, *Ann.*, 1881, 207, 244.

Raiford, *J. Am. Chem. Soc.*, 1919, 41, 2080.

m-Hydroxybenzanilide (N-Benzoyl-m-aminophenol).

Needles from toluene. M.p. 174° . Sol. EtOH, Et₂O. Spar. sol. C_6H_6 .

Et ether: benzoyl-m-phenetidine, benz-m-phenetidine. $\text{C}_{15}\text{H}_{15}\text{O}_2\text{N}$. MW, 241. Needles from EtOH. M.p. 103° . Sol. Me_2CO , C_6H_6 . Spar. sol. H_2O , EtOH, Et₂O, ligroin.

O-Benzoyl: prisms from C_6H_6 . M.p. 153° . Spar. sol. Et₂O. Insol. ligroin.

Meyer, Sundmacher, *Ber.*, 1899, 32, 2124.

Ikuta, *Am. Chem. J.*, 1893, 15, 43.

Reverdin, Lokietek, *Bull. soc. chim.*, 1915, 17, 408.

p-Hydroxybenzanilide (N-Benzoyl-p-amino-phenol).

Fine needles. M.p. $216-17^\circ$ (205° , 227°). Sol. hot AcOH. Spar. sol. H_2O , CHCl_3 , C_6H_6 , ligroin.

Me ether: benzoyl-p-anisidine, benz-p-anisidine. Leaflets from EtOH. M.p. $153-4^\circ$.

Et ether: benzoyl-p-phenetidine, benz-p-phenetidine. Leaflets from EtOH.Aq. M.p. 173° .

O-Acetyl: leaflets from C_6H_6 . M.p. 171° .

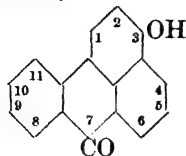
O-Benzoyl: needles from MeOH. M.p. 235° .

Ciamician, Silber, *Ber.*, 1905, 38, 1181.

Reverdin, *Ber.*, 1909, 42, 1524.

Reverdin, Dresel, *Ber.*, 1904, 37, 4452.

3-Hydroxybenzanthrone (See formulæ under Benzanthrone)



$C_{17}H_{10}O_2$

MW, 246

M.p. 317°.

I.G., D.R.P., 550,706, (*Chem. Abstracts*, 1932, 26, 4830); 552,269, (*Chem. Abstracts*, 1933, 27, 513).

4-Hydroxybenzanthrone.

Yellow needles from MeOH.Aq. M.p. 179-5°. Sol. conc. H_2SO_4 with green fluor. Spar. sol. cold dil. NaOH, more sol. hot to yellow sol.

Acetyl: cryst. from EtOH-AcOH. M.p. 200-1°.

Me ether: 4-methoxybenzanthrone. $C_{18}H_{12}O_2$. MW, 260. Yellow needles from C_6H_6 . M.p. 198-9°. Sol. conc. H_2SO_4 , conc. HNO_3 .

Perkin, *J. Chem. Soc.*, 1920, 117, 696.

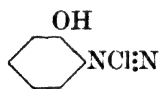
Perkin, Spencer, *J. Chem. Soc.*, 1922, 121, 479.

5-Hydroxybenzanthrone.

Yellow cryst. from EtOH or xylene. M.p. 291°. Sol. H_2SO_4 with fluor. Sol. dil. NaOH.

Badische, D.R.P., 187,495, (*Chem. Zentr.*, 1907, 11, 1367).

o-Hydroxybenzenediazonium chloride (*o-Phenoldiazonium chloride*)



$C_6H_5ON_2Cl$

MW, 156.5

Colourless cryst. from MeOH or EtOH-Et₂O. Quickly darkens in air. Decomp. at 152°. Very sol. H_2O . Insol. pet. ether, $CHCl_3$, C_6H_6 .

Hantzsch, Davidson, *Ber.*, 1896, 29, 1528.

Oddo, *Gazz. chim. ital.*, 1895, 25, 336.

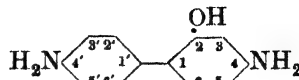
p-Hydroxybenzenediazonium chloride (*p-Phenoldiazonium chloride*).

White needles. Explodes on heating. Decomp. quickly in air.

$C_6H_5ON_2Cl.HgCl_2.H_2O$: white needles, decomp. at 156°.

See second reference above.

2-Hydroxybenzidine (*2-Hydroxy-4:4'-diaminodiphenyl*)



$C_{12}H_{12}ON_2$

MW, 200

Plates from H_2O . M.p. 226-7°. Sol. hot EtOH, hot H_2O . Spar. sol. Et₂O, C_6H_6 .

Me ether: $C_{13}H_{14}ON_2$. MW, 214. Plates from C_6H_6 -pet. ether. M.p. 103-103.3°. Sol. H_2O , Et₂O. *Picrate*: m.p. 220° decomp.

Hydrochloride: plates. Spar. sol. H_2O .

Picrate: yellow needles. M.p. 220° decomp.

Jacobson, Franz, Hönlgsberger, *Ber.*

1903, 36, 4072, 4113.

3-Hydroxybenzidine (*3-Hydroxy-4:4'-diaminodiphenyl*).

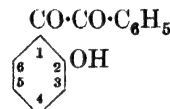
Plates from H_2O . M.p. 185°. Spar. sol. H_2O , cold EtOH, Et₂O, C_6H_6 . $FeCl_3 \rightarrow$ deep red col.

Et ether: $C_{14}H_{16}ON_2$. MW, 228. Needles from H_2O . M.p. 134-5° (139°).

See first reference above and also

Weinberg, *Ber.*, 1887, 20, 3173.

2-Hydroxybenzil (*Phenyl 2-hydroxyphenyl diketone*)



$C_{14}H_{10}O_3$

MW, 226

Yellow plates from ligroin. M.p. 74°. Sol. EtOH, Et₂O, C_6H_6 . Sol. alkalis with yellow col. Alc. $FeCl_3 \rightarrow$ reddish-violet col.

Me ether: $C_{15}H_{12}O_3$. MW, 240. Yellow prisms. M.p. 71.5°. 2:4-Dinitrophenylhydrazones: yellow needles from AcOH. M.p. 176-7°.

Asahina, Terasaka, *Chem. Zentr.*, 1923, III, 434.

Asahina, Asano, *Ber.*, 1929, 62, 173.

Brass, Willig, Hanssen, *Ber.*, 1930, 63, 2615.

4-Hydroxybenzil (*Phenyl 4-hydroxyphenyl diketone*).

Orange needles from EtOH.Aq. M.p. 175°. Sol. org. solvents. Insol. H_2O . Yellow alc. sol. \rightarrow red on addn. of alkali.

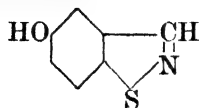
Me ether: cryst. M.p. 62-3°.

Dioxime: hydrochloride, needles, m.p. 155°.

Weisl, *Monatsh.*, 1905, 28, 992.

McKenzie, Luis, Tiffeneau, Weill, *Bull. soc. chim.*, 1929, 45, 418.

5-Hydroxybenzisothiazole

 C_7H_5ONS

MW, 151

Needles from H_2O , EtOH, or C_6H_6 . M.p. 156° . Very sol. AcOH. Spar. sol. pet. ether.

B, HBr: colourless needles. M.p. 240° decomp. Hyd. by H_2O .

Benzoyl: hard plates from EtOH. M.p. 125° .

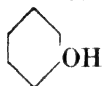
Fries, *Ann.*, 1927, **454**, 281.

***o*-Hydroxybenzoic Acid.**

See Salicylic Acid.

***m*-Hydroxybenzoic Acid**

COOH

 $C_7H_6O_3$

MW, 138

Needles from H_2O . M.p. 200.8° . Very sol. hot H_2O , EtOH, Me_2CO . Sol. Et₂O. Spar. sol. cold H_2O , C_6H_6 . $k = 8.7 \times 10^{-5}$ at 25° .

Me ester: $C_8H_8O_3$. MW, 152. Needles from C_6H_6 -pet. ether. M.p. 69° (71.5°). B.p. $280-280.5^\circ/709$ mm.

Et ester: $C_9H_{10}O_3$. MW, 166. Plates from C_6H_6 . M.p. $72-3^\circ$ ($72-4^\circ$). B.p. 295° , $211^\circ/65$ mm. Very sol. EtOH, Et₂O. Spar. sol. H_2O .

Amide: *m*-hydroxybenzamide. $C_7H_7O_2N$. MW, 137. Plates from H_2O . M.p. 170.5° . Very sol. hot H_2O , EtOH, Et₂O. Spar. sol. cold H_2O .

Nitrile: *m*-cyanophenol, *m*-hydroxybenzonitrile. C_7H_5ON . MW, 119. Plates from H_2O . M.p. 82° . Very sol. EtOH, Et₂O, hot H_2O .

Anilide: needles from EtOH.Aq. M.p. $154-5^\circ$. Very sol. EtOH. Spar. sol. Et₂O, CS_2 , C_6H_6 . Insol. $CHCl_3$.

Me ether: see *m*-Methoxybenzoic Acid.

Et ether: see *m*-Ethoxybenzoic Acid.

O-Acetyl: *m*-acetoxybenzoic acid. $C_9H_8O_4$. MW, 180. Cryst. from xylene. M.p. 131.5° . $k = 1.3 \times 10^{-4}$. Very sol. EtOH, Et₂O. Sol. hot H_2O .

Offermann, *Ann.*, 1894, **280**, 6.

***p*-Hydroxybenzoic Acid.**

Prisms from xylene-EtOH. M.p. $213-14^\circ$. Cryst. + $1H_2O$ from EtOH.Aq. or Me_2CO -EtOH. Very sol. EtOH. Sol. Me_2CO , Et₂O. Spar. sol. H_2O , C_6H_6 . Insol. CS_2 . $k = 2.86 \times 10^{-5}$. Many of the esters possess antiseptic and fungicidal properties.

Me ester: needles from EtOH.Aq. M.p. 131° . B.p. $270-80^\circ$ decomp.

Et ester: cryst. M.p. 116° . B.p. $297-8^\circ$. Very sol. EtOH, Et₂O. Spar. sol. H_2O , $CHCl_3$, pet. ether, CS_2 .

Amide: *p*-hydroxybenzamide. Needles + $1H_2O$ from H_2O . M.p. 162° . Very sol. EtOH, hot H_2O . Sol. Et₂O. Spar. sol. $CHCl_3$, CS_2 .

Nitrile: *p*-cyanophenol, *p*-hydroxybenzonitrile. Cryst. M.p. 113° . Very sol. EtOH, Et₂O, $CHCl_3$. Spar. sol. H_2O . $k = 3.0 \times 10^{-8}$ at 25° .

Anilide: plates from H_2O . M.p. $196-7^\circ$. Very sol. EtOH. Spar. sol. Et₂O. Insol. $CHCl_3$.

Me ether: see Anisic Acid.

Et ether: see *p*-Ethoxybenzoic Acid.

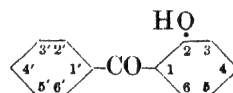
O-Acetyl: *p*-acetoxybenzoic acid. Plates from C_6H_6 . M.p. $187-187.5^\circ$.

Hartmann, *J. prakt. Chem.*, 1877, **16**, 39.

Hydroxybenzoic Acid sulphonic Acid.

See Hydroxysulphobenzoic Acid.

2-Hydroxybenzophenone (*Phenyl 2-hydroxyphenyl ketone*, *2-hydroxydiphenyl ketone*, *o-benzoylphenol*)

 $C_{13}H_{10}O_2$

MW, 198

Plates from EtOH.Aq. M.p. 39° . B.p. $250^\circ/560$ mm. Very sol. EtOH, Et₂O, AcOH, C_6H_6 . Spar. sol. pet. ether. Insol. H_2O . Yellow sols. in alkalis. KOH fusion \rightarrow salicylic acid. $PbO_2 \rightarrow$ xanthone.

Me ether: 2-methoxybenzophenone, *o*-benzoylanisole. $C_{14}H_{12}O_2$. MW, 212. M.p. 39° . B.p. $210^\circ/27$ mm. *Oxime*: exists in two forms. (i) M.p. 130° , (ii) m.p. 150° .

Et ether: 2-ethoxybenzophenone, *o*-benzoylphenetole. $C_{15}H_{14}O_2$. MW, 226. M.p. 40° . B.p. $199^\circ/20$ mm. *Oxime*: m.p. 159° . *Semicarbazone*: m.p. $159-60^\circ$.

syn-Oxime: needles from C_6H_6 . M.p. 141° . $PCl_5 \rightarrow$ salicylanilide. Formic acid \rightarrow *anti*-form.

anti-Oxime: plates from C_6H_6 . M.p. 143° . $PCl_5 \rightarrow$ 2-phenylbenzoxazole.

Phenylhydrazone: prisms from EtOH. M.p. 155° .

Ullmann, Goldberg, *Ber.*, 1902, **35**, 2811.

Bonnard, Meyer-Oulif, *Bull. soc. chim.*, 1931, **49**, 1303.

Köhler, Bruce, *J. Am. Chem. Soc.*, 1931, **53**, 1569.

3-Hydroxybenzophenone (*Phenyl 3-hydroxyphenyl ketone*, *3-hydroxydiphenyl ketone*, *m-benzoylphenol*).

Plates from EtOH. M.p. 116°. Very sol. EtOH, Et₂O.

Me ether: 3-methoxybenzophenone, *m*-benzoylanisole. M.p. 37°. B.p. 342-3°/730 mm. Very sol. EtOH, C₆H₆. Insol. H₂O.

syn-Oxime: needles. M.p. 76°. KOH → *anti*-form.

anti-Oxime: needles from C₆H₆. M.p. 126°. HCl or heat at m.p. → *syn*-form.

See first reference above and also Smith, *Ber.*, 1891, 24, 4045.

4-Hydroxybenzophenone (*Phenyl 4-hydroxyphenyl ketone*, *4-hydroxydiphenyl ketone*, *p-benzoylphenol*).

Plates from EtOH.Aq. M.p. 135°. Very sol. EtOH, Et₂O, AcOH. Spar. sol. H₂O.

Me ether: 4-methoxybenzophenone, *p*-benzoylanisole. Prisms from Et₂O. M.p. 61-2°. B.p. 354-5°/729 mm. Very sol. EtOH, Et₂O. *Phenylhydrazone*: exists in two forms. (i) Prisms from EtOH. M.p. 132°. (ii) Cryst. from Et₂O. M.p. 90°. *syn-Oxime*: cryst. from EtOH. M.p. 115-16°. *anti-Oxime*: plates from EtOH. M.p. 137-8°.

Et ether: 4-ethoxybenzophenone. Plates from AcOH. M.p. 38-9°. B.p. 242°/40 mm.

Acetyl: needles from EtOH. M.p. 81°. Very sol. Et₂O, AcOH, C₆H₆.

Benzoyl: prisms from EtOH. M.p. 94-5°. Very sol. hot EtOH. Sol. Me₂CO, AcOEt, C₆H₆.

Phenylhydrazone: m.p. 144°.

Semicarbazone: m.p. 194°.

syn-Oxime: needles. M.p. 81°. HCl or heat at m.p. → *anti*-form.

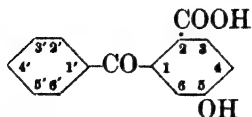
anti-Oxime: prisms from AcOH.Aq. M.p. 152°. Boiling NaOH → *syn*-form.

Blicke, Weinkauff, *J. Am. Chem. Soc.*, 1932, 54, 1448.

Smith, *Ber.*, 1891, 24, 4040.

Schäfer, *Ann.*, 1891, 264, 159.

5-Hydroxybenzophenone-2-carboxylic Acid (*4-Hydroxy-o-benzoylbenzoic acid*)



C₁₄H₁₀O₄

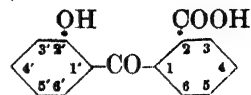
MW, 242

Leaflets. Decomp. at 220-22°. Sol. EtOH, Et₂O. Prac. insol. CHCl₃, C₆H₆. NaOH fusion → benzoic and 4-hydroxybenzoic acids.

Kliegl, *Ber.*, 1905, 38, 296.

2'-Hydroxybenzophenone-2-carboxylic

Acid (*2-o-Hydroxybenzoylbenzoic acid*, *o-salicyloylbenzoic acid*)



C₁₄H₁₀O₄

MW, 242

Cryst. from AcOH. M.p. 171-2°. Sol. EtOH, Et₂O, AcOH, hot Me₂CO, hot PhNO₂. Spar. sol. C₆H₆, hot H₂O. Yellow sols. in alkalis. Red sol. in conc. H₂SO₄.

Et ester: C₁₆H₁₄O₄. MW, 270. M.p. 62°.

Me ether: 2-*o*-methoxybenzoylbenzoic acid. C₁₅H₁₂O₄. MW, 256. Cryst. from toluene. M.p. 144-5°.

Ullmann, Schmidt, *Ber.*, 1919, 52, 2106.

Bayer, D.R.P., 269,336, (*Chem. Zentr.*, 1914, I, 508).

Sieglitz, *Ber.*, 1924, 57, 317.

3'-Hydroxybenzophenone-2-carboxylic Acid (*2-m-Hydroxybenzoylbenzoic acid*).

M.p. 181-2°. H₂SO₄ at 100° → 1- and 2-hydroxyanthraquinones.

Et ester: prisms from C₆H₆. M.p. 91-3°.

Basler Chem. Fabr., D.R.P., 148,110, (*Chem. Zentr.*, 1904, I, 328).

Bayer, D.R.P., 279,201, (*Chem. Zentr.*, 1914, II, 1175).

4'-Hydroxybenzophenone-2-carboxylic Acid (*2-p-Hydroxybenzoylbenzoic acid*).

Leaflets from H₂O. M.p. 213° (210°). Sol. EtOH, Et₂O, AcOH, PhNO₂, hot H₂O. Yellow sols. in alkalis.

Me ester: C₁₅H₁₂O₄. MW, 256. Cryst. from MeOH. M.p. 134°. Sol. H₂SO₄ with lemon-yellow col.

Me ether: *o*-anisoylbenzoic acid, 2-*p*-methoxybenzoylbenzoic acid. C₁₆H₁₂O₄. MW, 256. Leaflets from H₂O. M.p. 148° (142-3°). Sol. EtOH, Et₂O, AcOH, CHCl₃, toluene. Spar. sol. H₂O. *Me ester*: C₁₆H₁₄O₄. MW, 270. Plates from MeOH. M.p. 63°.

Et ether: 2-*p*-ethoxybenzoylbenzoic acid. C₁₆H₁₄O₄. MW, 270. Cryst. from toluene. M.p. 135-6°. Sol. Et₂O, C₆H₆, hot EtOH. Spar. sol. hot H₂O.

Phenyl ether: 2-*p*-phenoxybenzoylbenzoic acid. C₂₀H₁₄O₄. MW, 318. Needles from EtOH.Aq. M.p. 163-5°. Sol. EtOH, Et₂O, AcOH, C₆H₆. Insol. ligroin. Sol. conc. H₂SO₄ with red col.

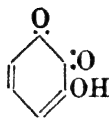
Friedländer, *Ber.*, 1893, 26, 176.

Meyer, Turnau, *Monatsh.*, 1909, 30, 486.

Grande, *Gazz. chim. ital.*, 1890, 20, 124.

Kipper, *Ber.*, 1905, 38, 2492.

Ullmann, Schmidt, *Ber.*, 1919, 52, 2106.

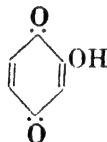
3-Hydroxy-*o*-benzoquinone (3-Hydroxy-*o*-quinone) $C_6H_4O_3$

MW, 124

Me ether: 3-methoxy-*o*-benzoquinone. $C_7H_6O_3$. MW, 138. Red prisms or needles. M.p. 115–20°. Sol. $CHCl_3$. Spar. sol. C_6H_6 . Sols. in H_2O , EtOH, Et_2O and dil H_2SO_4 are red.

Et ether: $C_8H_8O_3$. MW, 152. *Oxime*: m.p. 102°.

Willstätter, Müller, *Ber.*, 1911, **44**, 2179.

Hydroxy-*p*-benzoquinone (Hydroxyquinone) $C_6H_4O_3$

MW, 124

Yellow plates from C_6H_6 . Darkens on exposure to light. Blackens at 124°. Sol. Me_2CO , EtOH. Sols. are stable. Aq. sol. reacts acid.

Me ether: methoxy-*p*-benzoquinone, methoxyquinone. $C_7H_6O_3$. MW, 138. Yellow needles from H_2O . M.p. 145° (140°). Sublimes at 80–90° in long needles. Sol. EtOH. Spar. sol. H_2O , ligroin. Conc. H_2SO_4 → blue sol. → green on dilution.

Et ether: ethoxy-*p*-benzoquinone, ethoxyquinone. $C_8H_8O_3$. MW, 152. Yellow needles. M.p. 119–20° (117°). Sol. EtOH, Et_2O . Mod. sol. H_2O . Volatile in steam. Sublimes.

Willstätter, Müller, *Ber.*, 1911, **44**, 2180.

Bechhold, *Ber.*, 1889, **22**, 2381.

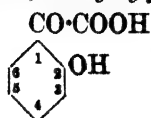
Will, Pukall, *Ber.*, 1887, **20**, 1132.

Jacobson, Huber, *Ann.*, 1909, **369**, 14.

Gomberg, Stone, *J. Am. Chem. Soc.*, 1916, **38**, 1594.

Hydroxybenzoylbenzoic Acid.

See Hydroxybenzophenone-carboxylic Acid and Benzoylsalicylic Acid.

2-Hydroxybenzoylformic Acid (2-Hydroxyphenylglyoxylic acid, salicyloylformic acid) $C_8H_6O_4$

MW, 166

Yellow plates from C_6H_6 -ligroin. M.p. 56–7° (41–2°).

Et ester: $C_{10}H_{10}O_4$. MW, 194. M.p. 15°. Decomp. on dist. in vacuo.

Acetyl: needles from H_2O . M.p. 101–6° (+ $1H_2O$), 134.5–135.5° (anhyd.). *Me ester*: plates from MeOH. M.p. 109–10°. *Amide*: prisms from EtOH. M.p. 170° decomp.

Nitrile: plates from AcOH. M.p. 110–11°. B.p. 149–51°/14 mm.

Oxime: needles from EtOH.Aq. M.p. 149° decomp.

Phenylhydrazone: yellow needles from EtOH.Aq. M.p. 148°.

Stoermer, *Ber.*, 1909, **42**, 201.

Anschütz, *Ann.*, 1909, **368**, 85.

Fries, Pfaffendorf, *Ber.*, 1912, **45**, 157.

3-Hydroxybenzoylformic Acid (3-Hydroxyphenylglyoxylic acid).

Me ether-nitrile: 3-methoxybenzoyl cyanide. $C_9H_7O_2N$. MW, 161. Cryst. from C_6H_6 -pet. ether. M.p. 111–12°. Very sol. EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin.

Mauthner, *Ber.*, 1909, **42**, 192.

4-Hydroxybenzoylformic Acid (4-Hydroxyphenylglyoxylic acid).

Needles from Et_2O - C_6H_6 -ligroin. M.p. 177–8° (172–3°). Sol. H_2O , EtOH, Et_2O . Spar. sol. $CHCl_3$, C_6H_6 . Insol. ligroin.

Me ether: anisoylformic acid. $C_8H_8O_4$. MW, 180. Needles from C_6H_6 . M.p. 89° (93°). Very sol. EtOH, Et_2O . Sol. C_6H_6 . Spar. sol. pet. ether. *Oxime*: cryst. M.p. 145–6°. *Semicarbazone*: m.p. 201° decomp. *Amide*: $C_9H_9O_3N$. MW, 179. Needles from C_6H_6 . M.p. 151–2°. *Nitrile*: 4-methoxybenzoyl cyanide, anisoyl cyanide. $C_9H_7O_2N$. MW, 161. Needles from C_6H_6 -ligroin. M.p. 63–4°.

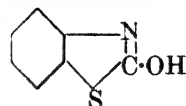
Et ether: $C_{10}H_{10}O_4$. MW, 194. Prisms + H_2O from H_2O . M.p. 52°. Cryst. from C_6H_6 . M.p. 125° decomp. *Phenylhydrazone*: m.p. 153°. *Nitrile*: $C_{10}H_9O_3N$. MW, 175. Cryst. from pet. ether. M.p. 43°.

Fromhertz, *Z. physiol. Chem.*, 1910, **70**, 355.

Bouveault, *Bull. soc. chim.*, 1898, **19**, 75.

Mauthner, *Ber.*, 1909, **42**, 191.

Vorländer, *Ber.*, 1911, **44**, 2464.

2-Hydroxybenzthiazole C_7H_5ONS

MW, 151

M.p. 136°. Sol. EtOH, Et_2O . Insol. H_2O .

Et ether: C_9H_9ONS . MW, 179. M.p. 25°. B.p. above 360°.

Acetyl: prisms from EtOH. M.p. 60°.

Hofmann, *Ber.*, 1879, **12**, 1128.

Jacobson, *Ber.*, 1886, **19**, 1811.

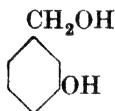
Hydroxybenzylacetophenone.

See Hydroxyphenylpropiophenone.

o-Hydroxybenzyl Alcohol.

See Saligenin.

m-Hydroxybenzyl Alcohol (ω -Hydroxy-m-cresol)



$C_7H_8O_2$

MW, 124

Cryst. from C_6H_6 . M.p. 73° (67°). Very sol. EtOH, Et₂O, hot H₂O. Spar. sol. CHCl₃.

Acetyl: m-hydroxybenzyl acetate. Cryst. M.p. 55°. Very sol. EtOH, Et₂O. Spar. sol. H₂O.

Diacetyl: b.p. about 290°. Very sol. EtOH, Et₂O.

3-Me ether: m-methoxybenzyl alcohol. $C_8H_{10}O_2$. MW, 138. B.p. 252°, 129.5°/9 mm.

Mettler, *Ber.*, 1905, **38**, 1752.

Tiemann, Ludwig, *Ber.*, 1882, **15**, 2047.

v. den Velden, *J. prakt. Chem.*, 1877, **15**, 165.

p-Hydroxybenzyl Alcohol (ω -Hydroxy-p-cresol).

Prisms or needles from H₂O. M.p. 124.5–125.5°. Very sol. EtOH, Et₂O, H₂O. Spar. sol. C_6H_6 . Insol. CHCl₃, pet. ether.

Acetyl: p-hydroxybenzyl acetate. Needles from H₂O. M.p. 84°.

Diacetyl: needles. M.p. 75°. B.p. 155–7°/11 mm.

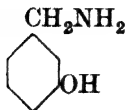
Me ether: see Anisyl Alcohol.

Auwers, Daecke, *Ber.*, 1899, **32**, 3374.

o-Hydroxybenzylamine.

See Salicylamine.

m-Hydroxybenzylamine (ω -Amino-m-cresol)



C_7H_9ON

MW, 123

B, HCl: m.p. 160°.

Me ether: m-methoxybenzylamine. $C_8H_{11}ON$. MW, 137. B.p. 103–4°/6 mm. *Picrate*: prisms

from MeOH. M.p. 181°. *Benzoyl*: needles from CHCl₃-ligroin. M.p. 95°. p-Nitrobenzoyl: needles from MeOH. M.p. 124°.

Shoppee, *J. Chem. Soc.*, 1932, 702.

p-Hydroxybenzylamine (ω -Amino-p-cresol).

Plates + 1H₂O from H₂O. M.p. 95° decomp.

B, HCl: plates from EtOH. M.p. 195°.

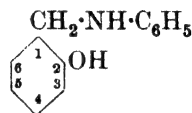
B, HI: m.p. 198–200°.

Me ether: see Anisamine.

Salkowski, *Ber.*, 1889, **22**, 2142.

Tiffeneau, *Bull. soc. chim.*, 1911, **9**, 823.

o-Hydroxybenzylaniline



$C_{13}H_{13}ON$

MW, 199

Leaflets from EtOH or ligroin. M.p. 113°. Sol. EtOH, Et₂O, acids, alkalis. Spar. sol. H₂O, ligroin.

B, HCl: m.p. 131°.

B, H, PtCl₆: m.p. 184° decomp.

Acetyl deriv.: m.p. 93°.

Paal, Senninger, *Ber.*, 1894, **27**, 1802.

Emmerich, *Ann.*, 1887, **241**, 344.

m-Hydroxybenzylaniline.

Prisms from EtOH.Aq. M.p. 103–4°. Sol. Me₂CO, EtOH, CHCl₃, C_6H_6 . Spar. sol. H₂O, cold ligroin.

N-Nitroso: m.p. 87.5–88°.

Bamberger, Müller, *Ann.*, 1900, **313**, 113.

p-Hydroxybenzylaniline.

Needles from EtOH, m.p. 208°. Prisms from C_6H_6 , m.p. 156°.

Me ether: $C_{14}H_{15}ON$. MW, 213. Prisms from MeOH. M.p. 64.5°. Sol. Et₂O, CHCl₃, C_6H_6 , ligroin. *B, HCl*: m. p. 163°. N-Acetyl: m.p. 54°.

Et ether: $C_{15}H_{17}ON$. MW, 227. Plates from MeOH. M.p. 65°.

Emmerich, *Ann.*, 1887, **241**, 355.

Bischoff, Fröhlich, *Ber.*, 1906, **39**, 3966.

Steinhart, *Ann.*, 1887, **241**, 337.

Fritsch, *Ann.*, 1901, **315**, 141.

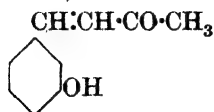
Hydroxybenzyl cyanide.

See under Hydroxyphenylacetic Acid.

o-Hydroxybenzylideneacetone.

See Salicylideneacetone.

m-Hydroxybenzylideneacetone (*Methyl 3-hydroxystyryl ketone*)



$\text{C}_{10}\text{H}_{10}\text{O}_2$

MW, 162

Me ether: m-methoxybenzylideneacetone. B.p. $173^\circ/8$ mm. *Phenylhydrazone*: m.p. $116-17^\circ$. *Semicarbazone*: needles from EtOH. M.p. $197-8^\circ$. Sol. hot EtOH, C_6H_6 , AcOH. Insol. ligroin.

Bauer, Vogel, *J. prakt. Chem.*, 1913, **88**, 332.

p-Hydroxybenzylideneacetone (*Methyl 4-hydroxystyryl ketone*).

Needles from H_2O . M.p. $102-3^\circ$. Sol. EtOH, AcOH. Spar. sol. H_2O . Orange-yellow sols. in alkalis.

Acetyl: needles from EtOH.Aq. M.p. $80-1^\circ$. Sol. EtOH, AcOH.

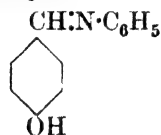
Me ether: see Anisylideneacetone.

Zincke, Mühlhausen, *Ber.*, 1903, **36**, 134.

o-Hydroxybenzylideneaniline.

See Salicylideneaniline.

p-Hydroxybenzylideneaniline



$\text{C}_{13}\text{H}_{11}\text{ON}$

MW, 197

Yellow plates from EtOH. M.p. $194-5^\circ$ ($190-1^\circ$). Sol. EtOH, Et_2O . Spar. sol. CHCl_3 , C_6H_6 . Insol. H_2O .

Me ether: see Anisylideneaniline.

Herzfeld, *Ber.*, 1877, **10**, 1271.

Senier, Forster, *J. Chem. Soc.*, 1914, **105**, 2464.

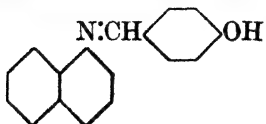
Hydroxy-benzylideneaniline.

See Benzylideneaminophenol.

o-Hydroxybenzylidene-1-naphthylamine.

See Salicylidene-1-naphthylamine.

p-Hydroxybenzylidene-1-naphthylamine



$\text{C}_{17}\text{H}_{13}\text{ON}$

MW, 247

Plates from xylene. M.p. $191-191.5^\circ$.

Me ether: anisylidene-1-naphthylamine.

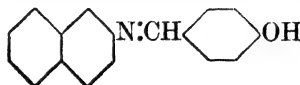
$\text{C}_{18}\text{H}_{15}\text{ON}$. MW, 261. Plates from EtOH. M.p. $100-1^\circ$. *B.HCl*: m.p. 211° decomp.

Senier, Forster, *J. Chem. Soc.*, 1914, **105**, 2470.

Pope, Fleming, *J. Chem. Soc.*, 1908, **93**, 1916.

o-Hydroxybenzylidene-2-naphthylamine.
See Salicylidene-2-naphthylamine.

p-Hydroxybenzylidene-2-naphthylamine



$\text{C}_{17}\text{H}_{13}\text{ON}$

MW, 247

Yellow plates from EtOH. M.p. 231.5° (220°).

Me ether: anisylidene-2-naphthylamine.

$\text{C}_{18}\text{H}_{15}\text{ON}$. MW, 261. Plates from EtOH. M.p. 98° .

Senier, Forster, *J. Chem. Soc.*, 1914, **105**, 2471.

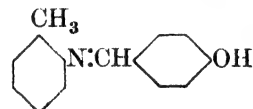
Emmerich, *Ann.*, 1887, **241**, 356.

Steinhart, *ibid.*, 341.

Hydroxybenzylidenepropionic Acid.

See p-Hydroxystyrylacetic Acid and Styrylglycollic Acid.

p-Hydroxybenzylidene-o-toluidine



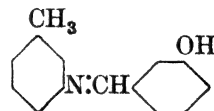
$\text{C}_{14}\text{H}_{13}\text{ON}$

MW, 211

Prisms from EtOH. M.p. $171-2^\circ$. Exhibits phototropy.

Senier, Forster, *J. Chem. Soc.*, 1914, **105**, 2464.

m-Hydroxybenzylidene-m-toluidine



$\text{C}_{14}\text{H}_{13}\text{ON}$

MW, 211

Prisms from C_6H_6 -pet. ether. M.p. $106-7^\circ$. Sol. most org. solvents.

Senier, Shephard, *J. Chem. Soc.*, 1909, **95**, 1951.

p-Hydroxybenzylidene-m-toluidine.

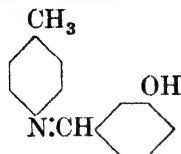
Yellow plates from EtOH, colourless cryst. from C_6H_6 . M.p. 181° . Sol. Et_2O , C_6H_6 to colourless sols. Sol. EtOH, AcOH, AcOEt, CHCl_3 to yellow sols. Exhibits phototropy.

Me ether: $\text{C}_{15}\text{H}_{15}\text{ON}$. MW, 225. Plates

from EtOH. M.p. 59°. *Hydrochloride*: m.p. 174°.

See above reference.

m-Hydroxybenzylidene-p-toluidine



$C_{14}H_{13}ON$

MW, 211

Leaflets from $CHCl_3$ -ligroin. M.p. 129°.

Bayer, D.R.P., 105,006, (*Chem. Zentr.*, 1899, II, 1078).

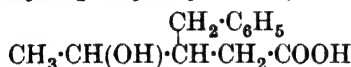
p-Hydroxybenzylidene-p-toluidine.

Orange leaflets from EtOH. M.p. 218°. Sol. hot EtOH, Et_2O . Spar. sol. H_2O , $CHCl_3$, C_6H_6 . Exhibits phototropy.

Herzfeld, *Ber.*, 1877, 10, 2196.

Senier, Forster, *J. Chem. Soc.*, 1914, 105, 2465.

3-Hydroxy-2-benzyl-n-valeric Acid (2- α -Hydroxyethyl-3-phenylbutyric acid)



$C_{12}H_{16}O_3$

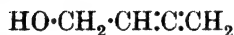
MW, 208

Prisms + $1H_2O$ from H_2O . M.p. 55-6°, anhyd. 75-6°. Sol. hot H_2O .

Lactone: benzylvalerolactone. $C_{12}H_{14}O_2$. MW, 190. Cryst. from CS_2 . M.p. 86°. Sol. toluene. Spar. sol. hot H_2O .

Erdmann, *Ann.*, 1889, 254, 202, 215.

4-Hydroxy-1:2-butadiene (Hydroxymethylallene, vinylidene-ethyl alcohol, 3-methylenallyl alcohol)



C_4H_6O

MW, 70

Lachrymatory liq. with pungent odour. B.p. 126-8°/756 mm., 68-70°/53 mm. D_4^{20} 0.9164. n_D^{20} 1.4759. Misc. with H_2O and most org. solvents.

Acetyl: b.p. 140-140.5°/780 mm., 85-6°/125 mm. D_4^{20} 0.9641. n_D^{20} 1.4504.

Carothers, Berchet, *J. Am. Chem. Soc.*, 1933, 55, 2812.

Hydroxybutane.

See Butyl Alcohol.

Hydroxybutane-dicarboxylic Acid.

See Ethylmalic Acid.

γ -Hydroxy- α -butenylbenzene.

See Methylstyrylcarbinol.

Hydroxybutylbenzene.

See Butylphenol and Phenylbutyl Alcohol.

3-Hydroxy-1-butylene.

See Methylvinylcarbinol.

1-Hydroxy-2-butylene.

See Crotonyl Alcohol.

3- ω -Hydroxybutylindole.

See 4-[3-Indolyl]-*n*-butyl Alcohol.

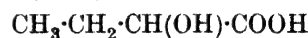
4-Hydroxybutyl phenyl Ketone.

See ω -Hydroxyvalerophenone.

2-Hydroxybutyraldehyde.

See Aldol.

1-Hydroxybutyric Acid



$C_4H_8O_3$

MW, 104

d-.
Isobutyl ester: $C_8H_{16}O_3$. MW, 160. B.p. 196°. D^{15} 0.944. n_D 1.4182. $[\alpha]_D + 7.7^\circ$.

l-.
Et ester: $C_6H_{12}O_3$. MW, 132. B.p. 165-70°. D^{15} 0.978. n_D 1.4101. $[\alpha]_D - 1.9^\circ$.

dl-.
Cryst. M.p. 43-4°. B.p. 225-60° decomp. and anhydride formation, 140°/14 mm. Sublimes at 60-70°. $k = 7.5 \times 10^{-5}$.

Et ester: b.p. 167°. D^{10} 0.9952. *Acetyl*: b.p. 198°.

Nitrile: propionaldehyde cyanhydrin. C_4H_7ON . MW, 85. B.p. 102-3°/23 mm. D^{15} 0.9690. n_D^{15} 1.4175. *Acetyl*: b.p. 102-3°/23 mm. D^0 1.019.

Acetyl: cryst. from CS_2 . M.p. 43°.

Me ether: 1-methoxybutyric acid. $C_5H_{10}O_3$. MW, 118. Liq. Sol. H_2O , EtOH, Et_2O . *Me ester*: $C_6H_{12}O_3$. MW, 132. B.p. 150-5°. *Et ester*: $C_7H_{14}O_3$. MW, 146. B.p. 159-61°(148°). D^{24} 0.9223.

Et ether: 1-ethoxybutyric acid. $C_6H_{12}O_3$. MW, 132. Liq. Sol. H_2O , EtOH, Et_2O . *Me ester*: $C_7H_{14}O_3$. MW, 146. B.p. 156-8°. *Et ester*: $C_8H_{16}O_3$. MW, 160. B.p. 166-70° (168.5°). D^{22} 0.8804.

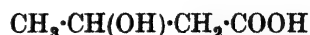
Bischoff, Walden, *Ann.*, 1894, 279, 102.

Anschütz, Motschmann, *Ann.*, 1912, 392, 103.

Guye, Jordan, *Bull. soc. chim.*, 1896, 15, 475.

Duvillier, *Ann. chim. phys.*, 1879, 17, 532.

2-Hydroxybutyric Acid



$C_4H_8O_3$

MW, 104

d-.
Na salt: cryst. from EtOH.

Quinine salt: $C_{20}H_{24}O_2N_2 \cdot C_4H_8O_3 \cdot H_2O$. Needles + $1H_2O$ from H_2O . M.p. $108-14^\circ$, anhyd. $126.5-127.5^\circ$. $[\alpha]_D^{17} - 126.2^\circ$ in EtOH.

Nitrile: 1-cyanoisopropyl alcohol. C_4H_7ON . MW, 85. B.p. $99-100^\circ/15$ mm. $[\alpha]_D^{18} + 8.78^\circ$.

l.

Cryst. Very hygroscopic. M.p. $49-50^\circ$. Very sol. H_2O , EtOH, Et_2O . Insol. C_6H_6 . $[\alpha]_D^{18} - 24.9^\circ$.

Quinine salt: needles + $4\frac{1}{2}H_2O$. M.p. $60-70^\circ$, anhyd. $124-6^\circ$. $[\alpha]_D^{18} - 129.9^\circ$ in EtOH.

Me ester: $C_5H_{10}O_3$. MW, 118. B.p. $67-68.5^\circ/13$ mm. $D_4^{20} 1.058$. $[\alpha]_D^{20} - 21.09^\circ$.

Nitrile: b.p. $99-100^\circ/15$ mm. $[\alpha]_D^{18} - 10.03^\circ$ in H_2O .

Amide: $C_4H_8O_2N$. MW, 103. Cryst. from AcOEt. M.p. $99-100^\circ$. $[\alpha]_D^{20} - 22.49^\circ$ in MeOH.

dl.

Hygroscopic syrup. B.p. $130^\circ/12-14$ mm. Volatile in steam. $k = 5.1 \times 10^{-5}$ (3.4×10^{-5}).

Me ester: b.p. $67-8^\circ/12-13$ mm.

Et ester: $C_6H_{12}O_3$. MW, 132. B.p. $178-80^\circ$, $76-7^\circ/15$ mm. $D_4^{17} 1.012$. $n_D^{17} 1.422$. **Acetyl:** b.p. $92-4^\circ/8$ mm.

Amide: prisms from H_2O . M.p. $84-7^\circ$.

Nitrile: b.p. $220-1^\circ/757$ mm., $123-5^\circ/22$ mm. $D_4^9 1.0134$. **Acetyl:** b.p. $210^\circ/765$ mm.

Acetyl: b.p. $93-4^\circ/0.5$ mm. $D^{18} 1.1346$. $n_D 1.4282$.

McKenzie, *J. Chem. Soc.*, 1902, **81**, 1402.

Fischer, Scheibler, *Ber.*, 1909, **42**, 1221.

Anschütz, Motschmann, *Ann.*, 1912, **392**, 106.

Vavon, *Ann. chim.*, 1914, **1**, 180.

3-Hydroxybutyric Acid



$C_4H_8O_3$ MW, 104

Liq. at -17° . Readily reverts to lactone. $k = 1.93 \times 10^{-5}$ at 25° .

Nitrile: 3-cyanopropyl alcohol. C_4H_7ON . MW, 85. B.p. $238-40^\circ/765$ mm., $150-1^\circ/68$ mm., $140^\circ/30$ mm. $D_4^8 1.0290$. **Acetyl:** b.p. 237° .

Lactone: see Butyrolactone.

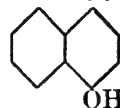
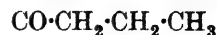
Me ether: 3-methoxybutyric acid. $C_5H_{10}O_3$. MW, 118. B.p. $105-105.5^\circ/7$ mm. $D_4^{20} 1.0596$. $n_D^{20} 1.42509$.

Et ether: 3-ethoxybutyric acid. $C_6H_{12}O_3$. MW, 132. B.p. $116.5-117^\circ/8$ mm. $D_4^{20} 1.0194$. $n_D^{20} 1.42531$.

Henry, *Chem. Zentr.*, 1898, **I**, 984.

Palomaa, Kenetti, *Ber.*, 1931, **64**, 800.

4-Hydroxy-1-butyronaphthone (4-Butyryl-1-naphthol, propyl 4-hydroxy-1-naphthyl ketone)



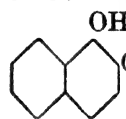
$C_{14}H_{14}O_2$

MW, 214

Me ether: 4-methoxybutyronaphthone. $C_{15}H_{16}O_2$. MW, 228. Leaflets from EtOH. M.p. $49-50^\circ$. **Picrate:** red needles. M.p. 90° .

Rousset, *Bull. soc. chim.*, 1896, **15**, 634.

1-Hydroxy-2-butyronaphthone (2-Butyryl-1-naphthol, propyl 1-hydroxy-2-naphthyl ketone)



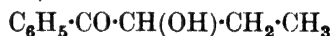
$C_{14}H_{14}O_2$

MW, 214

Needles from Et_2O . M.p. 78° .

Goldzweig, Kaiser, *J. prakt. Chem.*, 1891, **43**, 97.

β -Hydroxybutyrophenone (Ethylbenzoylcarbinol, 1-benzoylpropyl alcohol, 1-hydroxypropyl phenyl ketone)



$C_{10}H_{12}O_2$

MW, 164

Acetyl: yellow oil. B.p. $164-70^\circ/25-30$ mm. Sol. EtOH, Et_2O . Insol. H_2O .

Collett, *Compt. rend.*, 1897, **125**, 354.

γ -Hydroxybutyrophenone (Methylphenacylcarbinol, 1-benzoylisopropyl alcohol, 2-hydroxypropyl phenyl ketone)



$C_{10}H_{12}O_2$

MW, 164

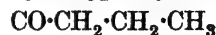
Oil. B.p. $150-2^\circ/12$ mm.

Me ether: γ -methoxybutyrophenone. $C_{11}H_{14}O_2$. MW, 178. Oil. B.p. $119-21^\circ/8$ mm. $D_4^{20} 1.0349$. $n_D^{20} 1.5168$.

Staudinger, Kon, *Ann.*, 1911, **384**, 124.

Dufraisse, Demontvignier, *Bull. soc. chim.*, 1927, **41**, 847.

o-Hydroxybutyrophenone (o-Butyrylphenol, propyl o-hydroxyphenyl ketone)



$C_{10}H_{12}O_2$

MW, 164

Cryst. M.p. 10° (8°). B.p. 124–6°/14 mm., 119°/9 mm. D_{20}^{25} 1.0683. n_D^{25} 1.5375.

Semicarbazone: cryst. from EtOH. M.p. 192–3°.

Phenylhydrazone: yellow cryst. M.p. 91–2°.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 286.

Sandulesco, Girard, *Bull. soc. chim.*, 1930, 47, 1308.

Morgan, Hickinbottom, *J. Chem. Soc.*, 1921, 119, 1885.

m-Hydroxybutyrophenone (m-Butyryl-phenol, propyl m-hydroxyphenyl ketone).

Plates from C_6H_6 -pet. ether. M.p. 63°.

p-Nitrophenylhydrazones: orange-yellow needles from C_6H_6 . M.p. 160°.

Morgan, Hickinbottom, *J. Chem. Soc.*, 1921, 119, 1884.

p-Hydroxybutyrophenone (p-Butyryl-phenol, propyl p-hydroxyphenyl ketone).

Plates from ligroin. M.p. 91°. B.p. 187–8°/9 mm. Sol. EtOH. Spar. sol. hot H_2O .

Me ether: p-methoxybutyrophenone, propyl p-methoxyphenyl ketone, p-butyrylanisole. $C_{11}H_{14}O_2$. MW, 178. M.p. 21–2°. B.p. 275°, 158–9°/19 mm. Semicarbazone: cryst. M.p. 183°.

Et ether: p-ethoxybutyrophenone, propyl p-ethoxyphenyl ketone, p-butyrylphenetole. $C_{12}H_{16}O_2$. MW, 192. Cryst. B.p. 173–4°/23 mm.

Benzoyl: cryst. from EtOH. M.p. 107–107.5°.

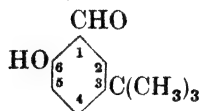
Baranger, *Bull. soc. chim.*, 1931, 49, 1216.

Sandulesco, Girard, *Bull. soc. chim.*, 1930, 47, 1308.

Klages, *Ber.*, 1902, 35, 2266.

Perkin, *J. Chem. Soc.*, 1889, 55, 548.

6-Hydroxy-3-tert.-butylbenzaldehyde (5-tert.-Butylsalicylaldehyde)



$C_{11}H_{14}O_2$ MW, 178

Liq. at –18°. B.p. 251–2°. D_{20}^{20} 1.039. $FeCl_3 \rightarrow$ violet col.

Me ether: $C_{12}H_{16}O_2$. MW, 192. B.p. 274–6°.

Benzyl ether: $C_{18}H_{20}O_2$. MW, 268. Prisms from MeOH. M.p. 70–71°.

Oxime: needles from pet. ether. M.p. 112°. Sol. H_2O , Et_2O , $CHCl_3$, C_6H_6 .

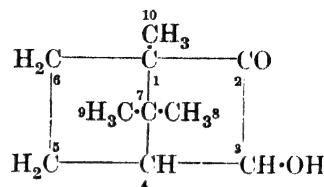
Phenylhydrazones: plates. M.p. 178°.

Dains, Rothrock, *Am. Chem. J.*, 1894, 16, 635.

2-Hydroxycamphane.

Borneol, q.v.

3-Hydroxycamphor



$C_{10}H_{16}O_2$ MW, 168

M.p. 211–12° (198°, 193–5°). Sol. pet. ether. $[\alpha]_D^{19} + 18.9^\circ$. $CrO_3 \rightarrow$ camphorquinone.

Acetyl: m.p. 63–4°.

Me ether: $C_{11}H_{18}O_2$. MW, 182. B.p. 81°/4 mm.

Semicarbazone: m.p. 223–4°.

Shimamoto, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, 25, 56.

Ishidate, *Chem. Abstracts*, 1928, 22, 3406.

Bredt, Ahrens, *J. prakt. Chem.*, 1926, 112, 273.

4-Hydroxycamphor.

Cryst. from pet. ether. M.p. 250°. Very sol. most org. solvents. Spar. sol. H_2O , pet. ether. $[\alpha]_D^{17} - 16^\circ$ in EtOH.

Acetyl: oil. B.p. 132°/11 mm.

Oxime: cryst. from toluene. M.p. 212°.

Semicarbazone: cryst. from EtOH.Aq. M.p. 236–8°.

Houben, Pfankuck, *Ann.*, 1931, 489, 217.

5-Hydroxycamphor (p-Hydroxycamphor).

Needles from ligroin. M.p. 222.5–223.5° (210°). Easily sol. EtOH, Et_2O , C_6H_6 , AcOH. Spar. sol. pet. ether. Sol. to 3.4% in H_2O at 15°. $[\alpha]_D^{19.5} + 41.0^\circ$ in EtOH. $[\alpha]_D^{16} + 47.4^\circ$.

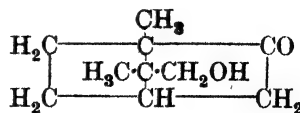
Acetyl: oil. B.p. 165–7°/22 mm., 149–50°/25 mm. $[\alpha]_D^{24} + 22.5^\circ$ in EtOH. Semicarbazone: needles from EtOH. M.p. 223–4° (237–8°).

Semicarbazone: needles from EtOH. M.p. 232.5–233.5° (222°).

Asahina, Ishidate, *Ber.*, 1934, 67, 73.

Takeuchi, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, 25, 70.

8-Hydroxycamphor (π -Hydroxycamphor)



$C_{10}H_{16}O_2$

MW, 168

Exists in *cis* and *trans* forms.

Cis :

Cryst. from pet. ether. M.p. 233–4°. Sol. to 8% in H₂O at 15°. $[\alpha]_D^{15} + 40.68^\circ$.

Acetyl : b.p. 160°/22 mm. *Semicarbazone* : needles from AcOEt. M.p. 210–11°.

Semicarbazone : prisms from AcOEt. M.p. 216–17°.

Trans :

Prisms from ligroin. M.p. 233°. Very sol. EtOH, Et₂O, C₆H₆. Spar. sol. pet. ether. Sol. to 12.5% in H₂O at 18°. $[\alpha]_D^{15} + 62.20^\circ$.

Acetyl : oil. B.p. 176°/47 mm. *Semicarbazone* : cryst. from EtOH.Aq. M.p. 234–5° decomp.

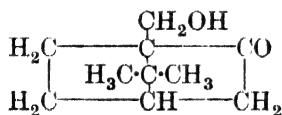
Semicarbazone : needles from AcOEt. M.p. 224–5°.

Asahina, Ishidate, *Ber.*, 1934, **67**, 76.

Shimamoto, *Sci. Papers Inst. Phys. Chem.*

Research Tokyo, 1934, **25**, 53.

10-Hydroxycamphor (β -Hydroxycamphor)



C₁₀H₁₆O₂ MW, 168

Cryst. from pet. ether. M.p. 216° (220°). $[\alpha]_D^{21} 51.9^\circ$ in EtOH.

Acetyl : b.p. 148°/16 mm., 128–30°/3–4 mm. *Semicarbazone* : needles from EtOH.Aq. M.p. 163°.

Semicarbazone : prisms from EtOH.Aq. M.p. 213° (200°).

Iki, *Sci. Papers Inst. Phys. Chem. Research Tokyo*, 1934, **25**, 81.

Asahina, Ishidate, *Ber.*, 1934, **67**, 1202.

1-Hydroxycaproic Acid (α -Hydroxycaproic acid)



C₁₀H₂₀O₃ MW, 188

Cryst. from CHCl₃ or pet. ether. M.p. 70.5°. Dist. at ord. press. \rightarrow nonyl aldehyde.

Me ester : C₁₁H₂₂O₃. MW, 202. Cryst. from pet. ether. M.p. 30°.

Acetyl : cryst. from pet. ether. M.p. 40°.

Anilide : m.p. 79°.

Bagard, *Bull. soc. chim.*, 1907, **1**, 350.

3-Hydroxycaproic Acid (γ -Hydroxycaproic acid)



C₁₀H₂₀O₃ MW, 188

Cryst. Readily dehydrates to lactone.

Diet. of Org. Comp.—II.

Lactone : C₁₀H₁₈O₂. MW, 170. B.p. 281°. Volatile in steam. Spar. sol. H₂O. Ba(OH)₂ \rightarrow Ba salt of 3-hydroxycaproic acid.

Fittig, Schneegans, *Ann.*, 1885, **227**, 93.

9-Hydroxycaproic Acid



C₁₀H₂₀O₃ MW, 188

Cryst. from Et₂O–pet. ether. M.p. 75° (75.5–76.5°). Sol. Et₂O. Spar. sol. pet. ether.

Me ester : C₁₁H₂₂O₃. MW, 202. M.p. 34–5°. B.p. 154°/7 mm., 145–7°/3 mm. D₂₀ 0.9618. n_D^{20} 1.4471. *Acetyl* : m.p. 15°. B.p. 175°/17 mm., 163°/10 mm. *Phenylurethane* : cryst. from Et₂O–pet. ether. M.p. 54–5°.

Amyl ester : C₁₅H₃₀O₃. MW, 258. B.p. 179–80°/8 mm. *Acetyl* : b.p. 210°/15 mm.

Acetyl : m.p. 36–7°. B.p. 213°/15 mm., 172–4°/2 mm. Very sol. pet. ether.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, **12**, 474.

Lycan, Adams, *J. Am. Chem. Soc.*, 1929, **51**, 628.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1926, **9**, 1074.

Grün, Wirth, *Ber.*, 1922, **55**, 2211.

1-Hydroxycaproic Acid



C₆H₁₂O₃ MW, 132

l–.

Prisms from Et₂O. M.p. 60°. $[\alpha]_D^{20} - 4.68^\circ$ in EtOH. Very sol. H₂O, EtOH, Et₂O, CHCl₃.

dl–.

Prisms from Et₂O. M.p. 60° (60–2°). Very sol. H₂O, EtOH, Et₂O, CHCl₃.

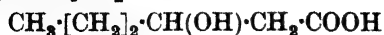
Amide : C₆H₁₃O₂N. MW, 131. M.p. 140–2°. Very sol. EtOH, boiling H₂O. Spar. sol. cold H₂O.

Et ether : 1-ethoxycaproic acid. C₈H₁₆O₃. MW, 160. B.p. 124–5°/10 mm. *Et ester* : C₁₀H₂₀O₃. MW, 188. B.p. 93°/16 mm., 87–9°/13 mm. *Chloride* : C₈H₁₅O₂Cl. MW, 178.5. B.p. 69°/9 mm. *Amide* : C₈H₁₇O₂N. MW, 159. Plates from pet. ether. M.p. 78°.

Aberhalden, Weil, *Z. physiol. Chem.*, 1913, **84**, 50.

Blaise, Picard, *Ann. chim.*, 1912, **26**, 282.

Marvel, MacCorquodale, Kendall, Lazier, *J. Am. Chem. Soc.*, 1924, **46**, 2840.

2-Hydroxycaproic Acid

$\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

Oil. Very sol. H_2O . Boil with $\text{NaOH} \rightarrow$ 2-propylacrylic acid. Ba and Ag salts sol. H_2O .

Fittig, Baker, *Ann.*, 1894, 283, 124.

3-Hydroxycaproic Acid

$\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

Free acid not isolated: reverts to lactone.

NH_4 salt: cryst. M.p. 90° decomp.

Ag salt: colourless needles.

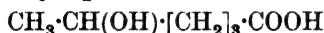
Ca salt: glassy solid.

Amide: $\text{C}_6\text{H}_{13}\text{O}_2\text{N}$. MW, 131. Prisms from CHCl_3 . M.p. 74° .

Lactone: see 3-Caprolactone.

Fittig, Dubois, *Ann.*, 1890, 256, 152.

Fittig, Hjelt, *Ann.*, 1881, 208, 68.

4-Hydroxycaproic Acid

$\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

Free acid passes immediately into the lactone.

Ag salt: cryst. from H_2O .

Ba salt: amorph. Very sol. H_2O . Sol. boiling EtOH .

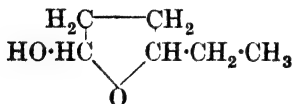
Et ester: $\text{C}_8\text{H}_{16}\text{O}_3$. MW, 160. B.p. $94-5^\circ/2$ mm. D_4^{25} 0.9832. n_D^{25} 1.4315.

Lactone: see 4-Caprolactone.

Lease, McElvain, *J. Am. Chem. Soc.*, 1933, 55, 807.

3-Hydroxy-*n*-caproic Aldehyde (5-Hydroxy-2-ethyltetrahydrofuran)

or



$\text{C}_6\text{H}_{12}\text{O}_2$ MW, 116

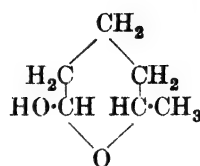
Exists in both cyclic and acyclic forms. B.p. $77-80^\circ/11$ mm. D_4^{18} 1.004. n_D^{18} 1.4368. Misc. with most org. solvents. Spar. sol. H_2O . Reduces Fehling's and $\text{NH}_3 \cdot \text{AgNO}_3$. Sol. conc. H_2SO_4 to red sol.

Me ether: 5-methoxy-2-ethyltetrahydrofuran, semi-acetal of 3-hydroxy-*n*-caproic aldehyde. $\text{C}_7\text{H}_{14}\text{O}_2$. MW, 130. B.p. $139-45^\circ$. D_4^{18} 0.9225. n_D^{18} 1.4164.

Helferich, *Ber.*, 1919, 52, 1811.

4-Hydroxy-*n*-caproic Aldehyde (6-Hydroxy-2-methyltetrahydropyran)

or



$\text{C}_6\text{H}_{12}\text{O}_2$ MW, 116

Exists in both cyclic and acyclic forms. B.p. $71-8^\circ/11$ mm. D_4^{18} 1.0065. n_D^{18} 1.4452. Misc. with most org. solvents. Spar. sol. H_2O . Reduces Fehling's and $\text{NH}_3 \cdot \text{AgNO}_3$. Ox. \rightarrow 4-hydroxy-*n*-caproic acid.

Me ether: 6-methoxy-2-methyltetrahydropyran, semi-acetal of 4-hydroxy-*n*-caproic aldehyde. $\text{C}_7\text{H}_{14}\text{O}_2$. MW, 130. B.p. $71-6^\circ/110$ mm. D_4^{18} 0.9232. n_D^{18} 1.4211.

p-Bromophenylhydrazone: m.p. 85° .

Helferich, Malkomes, *Ber.*, 1922, 55, 706.

1-Hydroxycaprylic Acid

$\text{C}_8\text{H}_{16}\text{O}_3$ MW, 160

Plates. M.p. 69.5° . Very sol. EtOH , Et_2O . Spar. sol. H_2O . $k = 1.55 \times 10^{-4}$.

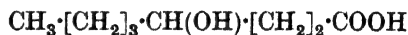
Et ester: $\text{C}_{10}\text{H}_{20}\text{O}_3$. MW, 188. B.p. $229-30^\circ/715$ mm.

Amide: $\text{C}_8\text{H}_{17}\text{O}_2\text{N}$. MW, 159. Plates. M.p. 150° .

Nitrile: heptaldehyde cyanhydrin. $\text{C}_8\text{H}_{15}\text{ON}$. MW, 141. M.p. -10° . B.p. $143.5-144^\circ/19$ mm. D_4^{17} 0.9048.

Erlenmeyer, Sigel, *Ann.*, 1875, 177, 103.

Bösesken, *Rec. trav. chim.*, 1918, 37, 165.

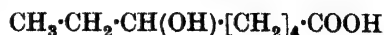
3-Hydroxycaprylic Acid

$\text{C}_8\text{H}_{16}\text{O}_3$ MW, 160

Free acid passes immediately to the lactone.

Lactone: 3-caprylolactone. $\text{C}_8\text{H}_{14}\text{O}_2$. MW, 142. B.p. $132-3^\circ/20$ mm.

Blaise, Koehler, *Bull. soc. chim.*, 1910, 7, 414.

5-Hydroxycaprylic Acid

$\text{C}_8\text{H}_{16}\text{O}_3$ MW, 160

Viscous liq. Slow dist. in vacuo \rightarrow lactone.

Lactone: 5-caprylolactone. $C_8H_{14}O_2$. MW, 142. Colourless liq. B.p. 114–15°/10 mm.

Blaise, Koehler, *Bull. soc. chim.*, 1910, 7, 413.

7-Hydroxycaprylic Acid



$C_8H_{16}O_3$ MW, 160

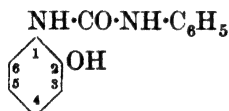
Needles from H_2O . M.p. 58°. Very sol. C_6H_6 , EtOH. Sol. H_2O . Spar. sol. pet. ether.

Me ester: $C_9H_{18}O_3$. MW, 174. B.p. 137–8°/8 mm: D_{20}^{20} 0.992.

Acetyl: $C_{10}H_{18}O_4$. MW, 202. M.p. 9–10°. B.p. 155–8°/1.5 mm. D_{20}^{20} 1.042.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, 12, 466.

o-Hydroxycarbanilide (o-Hydroxy-sym.-di-phenylurea)



$C_{13}H_{12}O_2N_2$ MW, 228

Cryst. M.p. 165–6°. Sol. H_2O , EtOH, Et_2O .

Et ether: $C_{15}H_{16}O_2N_2$. MW, 256. Needles from EtOH. M.p. 169–70°.

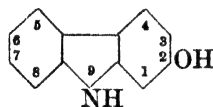
Leuckart, *J. prakt. Chem.*, 1890, 41, 327.

p-Hydroxycarbanilide (p-Hydroxy-sym.-di-phenylurea).

Needles from AcOH. M.p. 221°. Sol. hot EtOH. Spar. sol. hot H_2O , Et_2O , C_6H_6 .

Fischer, *Ber.*, 1900, 33, 1701 (Note).

2-Hydroxycarbazole



$C_{12}H_9ON$ MW, 183

Leaflets. M.p. 276°. Sol. usual org. solvents.

Et ether: $C_{14}H_{13}ON$. MW, 211. M.p. 217°.

Acetyl deriv.: m.p. 188°.

Ballauf, Muth, Schmelzer, U.S.P., 1,807,682, (*Chem. Abstracts*, 1931, 25, 4412).

Ballauf, Schmelzer, U.S.P., 1,834,015, (*Chem. Abstracts*, 1932, 26, 1000).

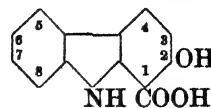
3-Hydroxycarbazole.

Needles from xylene. M.p. 260–1°. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. H_2O , ligroin.

Diacetyl: m.p. 113–14°.

Ruff, Stein, *Ber.*, 1901, 34, 1683.

2-Hydroxycarbazole-1-carboxylic Acid



$C_{13}H_9O_3N$ MW, 227

Cryst. M.p. 271–2°.

I.G., D.R.P., 512,234, (*Chem. Abstracts*, 1931, 25, 966).

1-Hydroxycarbazole-2-carboxylic Acid.

Cryst. M.p. 233–4°.

See previous reference.

2-Hydroxycarbazole-3-carboxylic Acid.

Cryst. M.p. 273–4°.

See previous reference.

Hydroxycarbostyryl.

See Dihydroxyquinoline.

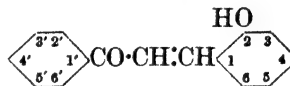
4-Hydroxy-3-carboxyazobenzene.

See 5-Benzeneazosalicylic Acid.

1-Hydroxy-2-carboxymethylhydrindene.

See 1-Hydroxyhydrindene-2-acetic Acid.

2-Hydroxychalkone (ω -Salicylideneacetophenone, phenyl 2-hydroxystyryl ketone)



$C_{15}H_{12}O_2$ MW, 224

Yellow plates from EtOH. M.p. 153–4°. Sol. EtOH. Spar. sol. $CHCl_3$, CS_2 . $NaHg \rightarrow$ 3-[o-hydroxyphenyl]-1-phenylpropyl alcohol. $NaOH \rightarrow$ flavanone.

Me ether: phenyl o-methoxystyryl ketone. $C_{16}H_{14}O_2$. MW, 238. Yellow needles from pet. ether. M.p. 64–5°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. ligroin. **Oxime**: m.p. 135–45°.

Acetyl: m.p. 68–9°.

Phenylhydrazone: m.p. 136°.

Harries, Busse, *Ber.*, 1896, 29, 378.

Löwenbein, *Ber.*, 1924, 57, 1515.

Auwers, Brink, *Ann.*, 1932, 493, 223.

Bablich, Kostanecki, *Ber.*, 1896, 29, 235.

3-Hydroxychalkone (ω -m-Hydroxybenzylideneacetophenone, phenyl 3-hydroxystyryl ketone).

Plates from dil. EtOH. M.p. 159–60°. Sol. EtOH, C_6H_6 , $CHCl_3$. Spar. sol. CS_2 . $NaOH \rightarrow$ dark yellow col. Conc. $H_2SO_4 \rightarrow$ yellow col.

Me ether: phenyl m-methoxystyryl ketone. Yellow plates from MeOH. M.p. 65°. B.p.

247°/12 mm. Sol. org. solvents. Insol. H_2O .
Oxime: m.p. 75–95°.

Et ether: phenyl *m*-ethoxystyryl ketone.
 $\text{C}_{17}\text{H}_{16}\text{O}_2$. MW, 252. Prisms from EtOH.
M.p. 75°.

Acetyl: m.p. 102–3°.

See last two references above and also
Bauer, Vogel, *J. prakt. Chem.*, 1913, **88**,
334.

4-Hydroxychalkone (ω -*p*-Hydroxybenzyl-
ideneacetophenone, phenyl 4-hydroxystyryl ketone).

Yellow cryst. from C_6H_6 . M.p. 182–3°. Dil.
 $\text{NaOH} \rightarrow$ yellow col. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ orange
col. $\text{KOH} \rightarrow$ acetophenone + 4-hydroxy-
benzaldehyde.

Me ether: see Anisylideneacetophenone.

Et ether: phenyl *p*-ethoxystyryl ketone. Dark
yellow plates. M.p. 63°.

Acetyl: m.p. 129–31°.

Skinner, Kurosawa, *J. Am. Chem. Soc.*,
1930, **52**, 2538.

Kostanecki, Schneider, *Ber.*, 1896, **29**,
1892.

2'-Hydroxychalkone (2-Hydroxy- ω -benzyl-
ideneacetophenone, *o*-hydroxyphenyl styryl ketone,
 β -salicyloylstyrene).

Yellow needles from EtOH. M.p. 88–9°.
EtOH + dil. $\text{HCl} \rightarrow$ 4-ketoflavan.

Me ether: *o*-methoxyphenyl styryl ketone.
 $\text{C}_{16}\text{H}_{14}\text{O}_2$. MW, 238. Yellow oil. B.p. 226°/
11.5 mm. Oxime: m.p. 135–40°.

Acetyl: m.p. 51–2°.

Auwers, Brink, *Ann.*, 1932, **493**, 223.

Feuerstein, Kostanecki, *Ber.*, 1898, **31**,
715.

3'-Hydroxychalkone (3-Hydroxy- ω -benzyl-
ideneacetophenone, *m*-hydroxyphenyl styryl ketone,
 β -*m*-hydroxybenzoylstyrene).

Plates from dil. EtOH. M.p. 126°. NaOH
 \rightarrow yellow col. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ yellowish-
red col.

Me ether: *m*-methoxyphenyl styryl ketone.
M.p. 41–2°. B.p. 236–8°/12 mm. Oxime: m.p.
132–7°.

Acetyl: m.p. 101°.

See first reference above and also

Kostanecki, Tambor, *Ber.*, 1899, **32**, 1924.

4'-Hydroxychalkone (4-Hydroxy- ω -benzyl-
ideneacetophenone, *p*-hydroxyphenyl styryl ketone,
 β -*p*-hydroxybenzoylstyrene).

Yellow needles from dil. EtOH. M.p. 172–3°.
Dil. $\text{NaOH} \rightarrow$ yellow col. Conc. $\text{H}_2\text{SO}_4 \rightarrow$

yellowish-red col. $\text{KOH} \rightarrow$ benzoic acid +
4-hydroxyacetophenone.

Me ether: *p*-methoxyphenyl styryl ketone,
 β -anisoylstyrene. Needles. M.p. 107°. *Per-
chlorate*: m.p. 63–78°. Oxime: m.p. 140–2°.

Et ether: $\text{C}_{17}\text{H}_{16}\text{O}_2$. MW, 252. Needles from
EtOH. M.p. 74–5°.

Phenyl ether: 4-cinnamoyldiphenyl ether.
 $\text{C}_{21}\text{H}_{16}\text{O}_2$. MW, 300. Plates. M.p. 85°. Sol.
EtOH, Me_2CO , Et_2O . Spar. sol. ligroin.

Acetyl: m.p. 90°.

Glucoside: m.p. 195°.

Dilthey, *Ber.*, 1919, **52**, 1203.

Skinner, Kurosawa, *J. Am. Chem. Soc.*,
1930, **52**, 2539.

Auwers, Brink, *Ann.*, 1932, **493**, 223.

See also last reference above.

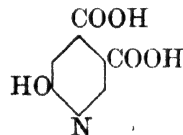
γ -Hydroxychalkone.

See Dibenzoylmethane.

3-Hydroxycholanin Acid.

See Lithocholic Acid.

6-Hydroxycinchomeronic Acid (2-Hydr-
oxypyridine-4 : 5-dicarboxylic acid)



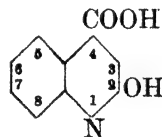
$\text{C}_7\text{H}_6\text{O}_5\text{N}$

MW, 184

Rhomboheda from dil. HCl . M.p. 287–9°.
Insol. H_2O , EtOH, Et_2O . No col. with FeCl_3 .
 Ac_2O at 200° \rightarrow 2-hydroxynicotinic acid.

Weidel, Strache, *Monatsh.*, 1886, **7**, 280.

2-Hydroxycinchoninic Acid (2-Hydroxy-
quinoline-4-carboxylic acid, carbostyryl-4-carb-
oxylic acid)



$\text{C}_{10}\text{H}_7\text{O}_3\text{N}$

MW, 189

Needles from H_2O . M.p. above 310°. Sol.
boiling H_2O , EtOH, AcOH. Spar. sol. cold H_2O .
 $\text{KMnO}_4 \rightarrow$ oxalic acid + NH_3 .

Me ester: $\text{C}_{11}\text{H}_9\text{O}_3\text{N}$. MW, 203. Needles
from H_2O . M.p. 242–3°.

Et ester: $\text{C}_{12}\text{H}_{11}\text{O}_3\text{N}$. MW, 217. Needles
from EtOH. Aq. M.p. 206–7°.

Et ether: 2-ethoxyquinoline-4-carboxylic acid.
 $\text{C}_{12}\text{H}_{11}\text{O}_3\text{N}$. MW, 217. Needles from H_2O .
M.p. 145–6°. Heat \rightarrow Et ester of parent acid.

Et ester: $C_{14}H_{15}O_5N$. MW, 245. Needles. M.p. 86°.

Borsche, Jacobs, *Ber.*, 1914, **47**, 359.
Königs, Koerner, *Ber.*, 1883, **16**, 2152.
Wojahn, *Arch. Pharm.*, 1931, **269**, 422.

6-Hydroxycinchoninic Acid (6-Hydroxyquinoline-4-carboxylic acid, xanthoquininic acid).

Plates from H_2O . M.p. 320° decomp. Very sol. AcOH, dil. HCl. Spar. sol. most org. solvents. $FeCl_3 \rightarrow$ blood red col.

Et ester: m.p. 185.5°.

Amide: $C_{10}H_8O_2N_2$. MW, 188. Needles from MeOH. M.p. 264°. *N-Di-Et*: cryst. from MeOH. M.p. 119°.

Chloride: $C_{10}H_6O_2NCl$. MW, 207.5. Orange cryst. M.p. 158° decomp.

Me ether: see Quininic Acid.

Et ether: 6-ethoxyquinoline-4-carboxylic acid. Yellow needles from propyl alcohol. M.p. 278°.

Methochloride: yellow plates. M.p. 295°.

Methiodide: orange-yellow needles from EtOH. M.p. 302°.

(Claus, Brandt, *Ann.*, 1894, **282**, 93.

John, *J. prakt. chem.*, 1930, **128**, 194.

7-Hydroxycinchoninic Acid (7-Hydroxyquinoline-4-carboxylic acid).

Me ether: 7-methoxyquinoline-4-carboxylic acid. $C_{11}H_9O_3N$. MW, 203. M.p. 273°. Sublimes readily in high vacuum at 160°. *Nitrile*: 7-hydroxy-4-cyanoquinoline. $C_{11}H_8ON_2$. MW, 184. Cryst. from EtOH.Aq. M.p. 153-4°.

Späth, Brunner, *Ber.*, 1924, **57**, 1250.

8-Hydroxycinchoninic Acid (8-Hydroxyquinoline-4-carboxylic acid).

Bright yellow powder. M.p. 254-6°. Sol. hot EtOH, AcOH. Spar. sol. boiling H_2O , C_6H_6 .

Weidel, Cobenzl, *Monatsh.*, 1880, **1**, 867.

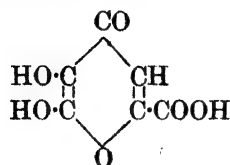
Hydroxycinnamaldehyde.

See Coumaraldehyde.

Hydroxycinnamic Acid.

See Coumaric Acid.

6-Hydroxycoumenic Acid (5:6-Dihydroxy- γ -pyrone-2-carboxylic acid)



$C_6H_4O_6$

MW, 172

Needles + $3H_2O$ from H_2O . M.p. 275°. Sol. H_2O , EtOH. Spar. sol. Et₂O. Insol. $CHCl_3$.

$FeCl_3 \rightarrow$ intense violet col. NH_4OH at 150° \rightarrow 4:5:6-trihydroxypicolinic acid.

Di-Me ether: 5:6-dimethoxy- γ -pyrone-2-carboxylic acid. $C_8H_8O_6$. MW, 200. Plates from H_2O . M.p. 242°. *Me ester*: $C_9H_{10}O_6$. MW, 214. Needles from MeOH. M.p. 97°.

Me ester: $C_7H_8O_6$. MW, 186. Needles from MeOH. M.p. 222°.

Et ester: $C_8H_8O_6$. MW, 200. Prisms from EtOH. M.p. 204°. *Diacetyl*: needles from EtOH. M.p. 75°.

Peratoner, Castellana, *Gazz. chim. ital.*, 1906, **36**, 4, 21.

Ost, *J. prakt. Chem.*, 1881, **23**, 441.

Tickle, Collic, *J. Chem. Soc.*, 1902, **81**, 1006.

Azzarello, *Atti accad. Lincei*, 1905, **14**, 163.

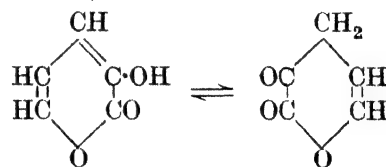
α -Hydroxyconiine.

See Conhydrine.

5-Hydroxyconiine.

See ψ -Conhydrine, Addendum Vol. I.

Hydroxycoumalin (3-Hydroxy- α -pyrone, isopyromucic acid)



$C_5H_4O_3$

MW, 112

M.p. (+ $2H_2O$) 80-5°, anhyd. 95° (91°). B.p. 112°/20 mm. Sol. to 4.5% in H_2O at 0°. Sol. EtOH, Et₂O, $CHCl_3$, hot C_6H_6 . Spar. sol. CS_2 . Decomp. by dil. alkalis. Reduces Fehling's and $NH_3 \cdot AgNO_3$.

Me ether: 3-methoxy- α -pyrone. $C_6H_6O_3$. MW, 126. Colourless needles. M.p. 60°. B.p. 130-5°/20 mm. Sol. H_2O , EtOH. Mod. sol. Et₂O.

Et ether: 3-ethoxy- α -pyrone. $C_7H_8O_3$. MW, 140. M.p. 52°. Sol. H_2O , EtOH.

Benzyl ether: prisms. M.p. 71°. Insol. H_2O .

Anhydride: $C_{10}H_6O_5$. MW, 206. White needles from EtOH. M.p. 73°. B.p. 235° slight decomp.

Phenylhydrazone: needles. M.p. 77°.

Acetyl: cryst. M.p. 28°. B.p. 152°/20 mm. Sol. most org. solvents. Spar. sol. H_2O .

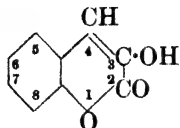
Benzoyl: prisms from EtOH. M.p. 85°. Sol. org. solvents. Spar. sol. H_2O .

Chavanne, *Bull. soc. chim.*, 1903, **29**, 402;

Ann. chim., 1904, **3**, 536.

α -Hydroxy-*p*-coumaric Acid.

See 4-Hydroxyphenylpyruvic Acid.

3-Hydroxycoumarin (α -Hydroxy-o-coumaric lactone)

$C_9H_6O_3$ MW, 162

Needles from EtOH or C_6H_6 . M.p. 153° . Sol. H_2O and most org. solvents.

Me ether: 3-methoxycoumarin. $C_{10}H_8O_3$. MW, 176. Needles from EtOH. M.p. 162° .

Phenylhydrazine: yellow leaflets from EtOH. M.p. $173-4^\circ$.

Erlenmeyer, Stadlin, *Ann.*, 1904, **337**, 292.

Plöchl, Wolfrum, *Ber.*, 1885, **18**, 1185.
Heilbron, Hill, Walls, *J. Chem. Soc.*, 1931, 1702.

4-Hydroxycoumarin (*Benzotetronic acid*, β -hydroxy-o-coumaric lactone).

Needles from H_2O . M.p. 206° . Very sol. EtOH, Et_2O , hot H_2O . $FeCl_3 \rightarrow$ brown col.

Me ether: 4-methoxycoumarin. Colourless flakes from H_2O . M.p. 124° .

Et ether: $C_{11}H_{10}O_3$. MW, 190. Yellow plates from Et_2O . M.p. 136° . B.p. $174^\circ/14$ mm.

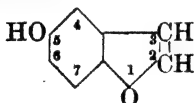
Acetyl: needles from C_6H_6 . M.p. 103° .

Anschütz, *Ann.*, 1909, **367**, 196.

Heilbron, Hill, *J. Chem. Soc.*, 1927, 1707.

7-Hydroxycoumarin.

See Umbelliferone.

5-Hydroxycoumarone

$C_9H_6O_2$ MW, 134

Me ether: $C_9H_6O_2$. MW, 148. B.p. $230-40^\circ$.

Stoermer, *Ann.*, 1900, **312**, 335.

Dumont, Kostanecki, *Ber.*, 1909, **42**, 913.

6-Hydroxycoumarone.

Me ether: b.p. $232-3^\circ$. D_{20}^{18} 1.1567. n_D^{18} 1.5664. Sol. EtOH, Et_2O . Insol. H_2O . Volatile in steam. Resinifies in conc. H_2SO_4 . *Picrate*: m.p. $64-5^\circ$.

Et ether: $C_{10}H_{10}O_2$. MW, 162. Leaflets. M.p. 10° . B.p. $230^\circ/10$ mm. Sol. conc. H_2SO_4 : addn. of $FeCl_3 \rightarrow$ intense violet col.

See above references.

 ω -Hydroxycresol.

See Hydroxybenzyl Alcohol and Saligenin.

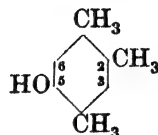
2-Hydroxycrotonic Acid.

See Acetoacetic Acid.

Hydroxycumene.

See Isopropylphenol.

5-Hydroxy- ψ -cumene (5-Hydroxy-1 : 2 : 4-trimethylbenzene, ψ -cumenol, 2 : 4 : 5-trimethylphenol)



$C_9H_{12}O$ MW, 136

Needles from H_2O . M.p. $70.5-71.5^\circ$. Sol. EtOH, Et_2O . Insol. cold H_2O . $k = 0.28 \times 10^{-10}$ at 25° .

Me ether: 2 : 4 : 5-trimethylanisole. $C_{10}H_{14}O$. MW, 150. B.p. $213-14^\circ$.

Et ether: 2 : 4 : 5-trimethylphenetole. $C_{11}H_{16}O$. MW, 164. B.p. $223-4^\circ$.

Isoamyl ether: $C_{14}H_{22}O$. MW, 206. B.p. $265-6^\circ$.

Benzyl ether: $C_{16}H_{18}O$. MW, 226. Prisms from EtOH. M.p. 45° .

Acetyl: needles from pet. ether. M.p. $34-34.5^\circ$. B.p. $245-6^\circ$.

Hofmann, *Ber.*, 1884, **17**, 1917.

Bamberger, Blangey, *Ann.*, 1911, **384**, 307.

Auwers, Bundesmann, Wieners, *Ann.*, 1926, **447**, 183.

6-Hydroxy- ψ -cumene (6-Hydroxy-1 : 2 : 4-trimethylbenzene, *iso- ψ -cumenol*, 2 : 3 : 5-trimethylphenol).

Needles from H_2O or pet. ether. M.p. $95-6^\circ$. B.p. $233^\circ/760$ mm.

Me ether: 2 : 3 : 5-trimethylanisole. B.p. $214-16^\circ/755$ mm.

Acetyl: b.p. 241° .

Benzoyl: prisms from pet. ether. M.p. 50° .

Phenylurethane: needles from pet. ether. M.p. 174° .

Auwers, Saurwein, *Ber.*, 1922, **55**, 2388.

Auwers, Bundesmann, Wieners, *Ann.*, 1926, **447**, 192.

Kruber, Schmitt, *Ber.*, 1931, **64**, 2274.

2-Hydroxycuminic Acid (4-Isopropylsalicylic acid, *isohydroxycuminic acid*, *o-hydroxy-p-isopropylbenzoic acid*)



$C_{10}H_{12}O_3$

MW, 180

3-Hydroxycuminic Acid

Needles from H_2O . M.p. $96-7^\circ$. Sol. EtOH, Et_2O , CHCl_3 . Spar. sol. H_2O . Volatile in steam. $\text{FeCl}_3 \rightarrow$ intense reddish-violet col. Dry dist. \rightarrow *m*-isopropylphenol.

Heymann, Koenigs, *Ber.*, 1886, **19**, 3314.
Jacobsen, *Ber.*, 1878, **11**, 1061.

3-Hydroxycuminic Acid (*m*-Hydroxy-*p*-isopropylbenzoic acid, *thymohydroxycuminic acid*).

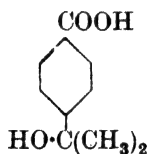
Prisms from H_2O . M.p. $141-3^\circ$. Sol. EtOH, Et_2O , CHCl_3 , C_6H_6 . Spar. sol. H_2O . $\text{KOH} \rightarrow$ hydroxyterephthalic + *m*-hydroxybenzoic acids.

Ester: $\text{C}_{12}\text{H}_{16}\text{O}_3$. MW, 208. Prisms from H_2O . M.p. $73-5^\circ$.

Barth, *Ber.*, 1878, **11**, 1571.

Heymann, Koenigs, *Ber.*, 1886, **19**, 3307.

α -Hydroxycuminic Acid (*p*- α -Hydroxyisopropylbenzoic acid)



$\text{C}_{10}\text{H}_{12}\text{O}_3$

MW, 180

Prisms from H_2O . M.p. $156-7^\circ$. Sol. EtOH, Et_2O . Spar. sol. H_2O . Ox. \rightarrow acetophenone + terephthalic acid. $\text{Ac}_2\text{O} \rightarrow$ *p*-isopropenylbenzoic acid.

Amide: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Needles from H_2O . M.p. $144-5^\circ$.

Nitrile: $\text{C}_{10}\text{H}_{11}\text{ON}$. MW, 161. Needles from pet. ether. M.p. $51-2^\circ$.

Meyer, *Ann.*, 1883, **219**, 249.

Fileti, Abbona, *Gazz. chim. ital.*, 1891, **21**, 400.

Hydroxycyclobutane.

See Cyclobutanol.

4-Hydroxycyclohexyl- α -alanine.

See Hexahydrotyrosine.

4-Hydroxycyclohexylethylamine.

See Hexahydrotyramine.

Hydroxycyclopentane.

See Cyclopentanol.

Hydroxycymene.

See Dimethyl-tolylcarbinol, Isopropylcresol, Carvacrol, and Thymol.

Hydroxydecahydronaphthalene.

See Decahydronaphthol.

3-Hydroxydecane.

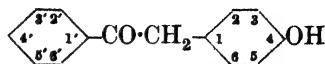
See Ethyl-*n*-heptylcarbinol.

4-Hydroxydeoxybenzoin (p-Phenacyl-

247

2-Hydroxy-3:5-diaminobenzoic Acid

phenol, phenyl 4-hydroxybenzyl ketone, ω -benzoyl-*p*-cresol)



$\text{C}_{14}\text{H}_{12}\text{O}_2$

MW, 212

Cryst. from H_2O . M.p. 129° . Sol. NaOH.

Acetyl: plates. M.p. 87° .

Ney, *Ber.*, 1888, **21**, 2449.

2'-Hydroxydeoxybenzoin (*o*-Hydroxyphenyl benzyl ketone, ω -salicyloyltoluene).

Plates from ligroin. M.p. 60° .

2:4-Dinitrophenylhydrazones: orange plates from AcOH. M.p. 219° .

Chadha, Mahal, Venkataraman, *J. Chem. Soc.*, 1933, 1461.

4'-Hydroxydeoxybenzoin (*p*-Hydroxyphenyl benzyl ketone).

Needles from EtOH. Aq., yellow cryst. from H_2O . M.p. 151° (142°). Sol. EtOH, Et_2O , AcOH, C_6H_6 . Sol. 150 parts boiling H_2O .

Me ether: *p*-methoxyphenyl benzyl ketone, ω -anisoyltoluene. $\text{C}_{15}\text{H}_{14}\text{O}_2$. MW, 226. Needles from MeOH. M.p. $77-8^\circ$. B.p. 360° . *Oxime*: m.p. 111° .

Acetyl: cryst. M.p. 82° . Sol. Et_2O . Spar. sol. EtOH.

Oxime: cryst. M.p. 85° . Sol. Et_2O , AcOH. Spar. sol. EtOH.

2:4-Dinitrophenylhydrazones: orange plates from AcOH. M.p. 224° .

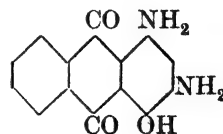
See above reference and also

Weiss, *Monatsh.*, 1905, **26**, 984.

Meisenheimer, Jochelson, *Ann.*, 1907, **355**, 291.

Ney, *Ber.*, 1888, **21**, 2450.

4-Hydroxy-1:3-diaminoanthraquinone



$\text{C}_{14}\text{H}_{10}\text{O}_3\text{N}_2$

MW, 254

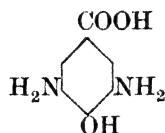
Dark red cryst. from AcOH. M.p. 266° .

Höchst, D.R.P., 183,332, (*Chem. Zentr.*, 1907, II, 765).

2-Hydroxy-3:5-diaminobenzoic Acid.

See 3:5-Diaminosalicylic Acid.

4-Hydroxy-3 : 5-diaminobenzoic Acid

 $C_7H_8O_3N_2$

MW, 168

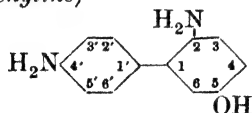
Brown plates. M.p. 205°. Oxidises rapidly in air.

B,HCl: needles. M.p. about 260° decomp. Very sol. H_2O .

Sulphate: prismatic needles. Sol. H_2O .

Reverdin, *Bull. soc. chim.*, 1908, 3, 593.

5-Hydroxy-2 : 4'-diaminodiphenyl (5-Hydroxydiphenylene)

 $C_{12}H_{12}ON_2$

MW, 200

Needles from C_6H_6 . M.p. 148°. Sol. EtOH, Me_2CO , hot H_2O . Spar. sol. C_6H_6 . Insol. Et_2O , ligroin.

Et ether: $C_{14}H_{16}ON_2$. MW, 228. Leaflets. M.p. 97°. Sol. EtOH, C_6H_6 . 2 : 4'-N-Diacetyl: m.p. 191°.

2 : 4'-N-Diacetyl: m.p. 269°.

2 : 4'-N-Dibenzoyl: m.p. 221°.

Tribenzoyl deriv.: needles from EtOH. M.p. 177-8°.

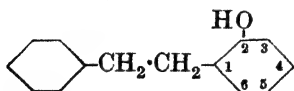
Jacobson, Tigges, *Ann.*, 1898, 303, 344.

Hydroxy-4 : 4'-diaminodiphenyl.

See Hydroxybenzidine.

 α -Hydroxy-4 : 4'-diaminotriphenylmethane.

See 4 : 4'-Diaminotriphenylcarbinol.

2-Hydroxydibenzyl (1-Phenyl-2-o-hydroxyphenylethane, ω -benzyl-o-cresol) $C_{14}H_{14}O$

MW, 198

White plates from EtOH.Aq. M.p. 81° (83.5°).

Me ether: $C_{15}H_{16}O$. MW, 204. Oil. B.p. 295°.

Kostanecki, Rost, Szabraniski, *Ber.*, 1905, 38, 943.

4-Hydroxydibenzyl (1-Phenyl-2-p-hydroxyphenylethane, ω -benzyl-p-cresol).

Plates from EtOH.Aq. M.p. 100-1°. Very sol. EtOH, C_6H_6 . Spar. sol. ligroin, pet. ether.

Me ether: plates from EtOH. M.p. 61°.

Phenylurethane: plates from EtOH or ligroin. M.p. 150°.

Stoermer, Kippe, *Ber.*, 1903, 36, 4009.

Freund, Remse, *Ber.*, 1890, 23, 2865.

 α -Hydroxydibenzyl.

See Phenylbenzylcarbinol.

Hydroxy-dibenzylacetic Acid.

See Dibenzylglycollic Acid.

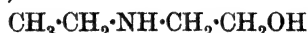
1-[3-Hydroxy-2 : 4-dicarboxyphenoxy]-isobutyric Acid.

See Nicouic Acid.

Hydroxydiethoxypropane.

See under Glycerol and Hydroxyacetone.

2-Hydroxydiethylamine (N-Ethylethanamine, 2-ethylaminoethyl alcohol, ethyl-hydroxyethyl-amine)

 $C_4H_{11}ON$

MW, 89

Oil. B.p. 169-70°. D_4^{20} 0.914. n_D^{20} 1.444. Sol. H_2O , EtOH, Et_2O . Spar. volatile in steam. Fumes in air.

B,HCl: needles. Hygroscopic.

$B_2H_2PtCl_6$: orange-yellow cryst. from EtOH. M.p. about 146°. Very hygroscopic.

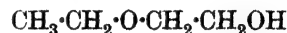
B_2HAuCl_4 : yellow needles from H_2O . M.p. 127°.

Picrate: prisms. M.p. 125-6°.

Schotte, Priewe, Roescheisen, *Z. physiol. Chem.*, 1928, 174, 144.

Knorr, Schmidt, *Ber.*, 1898, 31, 1073.

2-Hydroxydiethyl Ether (Ethyl 2-hydroxyethyl ether, ethylene glycol ethyl ether, 2-ethoxyethyl alcohol)

 $C_4H_{10}O_2$

MW, 90

B.p. 134.8°/743 mm. D_{15}^{15} 0.93535. n_D^{20} 1.40797. Solvent for lacquers, etc.

Benzoyl: b.p. 260-1°/738.5 mm. D_{25}^{25} 1.0585. n_D^{25} 1.4969.

p-Nitrobenzoyl: b.p. 163.5-164.5°/4 mm. D_{25}^{25} 1.2086. n_D^{25} 1.5220.

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, 46, 1503.

Conn, Collett, Lazzell, *J. Am. Chem. Soc.*, 1932, 54, 4370.

I.G., D.R.P., 558,646, (*Chem. Abstracts*, 1933, 27, 512).

Carbide and Carbon Chemicals Corp., U.S.P., 1,732,356, (*Chem. Abstracts*, 1930, 24, 127).

Hydroxydifurylacetic Acid.

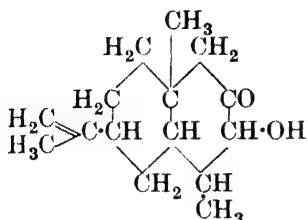
See Furilic Acid.

Hydroxydigitoxin

Hydroxydigitoxin.

See Gitoxigenin.

2-Hydroxy-1 : 2-dihydroeremophilone



$C_{15}H_{24}O_2$

MW, 236

Constituent of oil of *Eremophila Mitchellii*. Prisms from MeOH. M.p. 102–3°. $[\alpha]_{5461}^{20} + 94^\circ$ in MeOH. Readily sol. most org. solvents except MeOH, EtOH. Insol. H_2O . Reduces Fehling's.

Diacetyl deriv.: prisms from MeOH. M.p. 69–70°.

3 : 5-Dinitrobenzoyl : needles from MeOH. M.p. 145–6° after sintering at 139–40°.

2 : 4-Dinitrophenylhydrazones : golden-yellow needles from EtOH. M.p. 239–41° decomp.

Bradfield, Penfold, Simonsen, *J. Chem. Soc.*, 1932, 2757.

4-Hydroxy-3 : 5-dimethoxybenzaldehyde.

See Syringa-aldehyde.

4-Hydroxy-3 : 5-dimethoxybenzoic Acid.

See Syringic Acid.

3-Hydroxy-4 : 5-dimethoxybenzoic Acid.

See under Gallic Acid.

8-Hydroxy-6 : 7-dimethoxycoumarin.

See under Fraxetin.

Hydroxy-dimethoxy-phenylacetic Acid.

See Iridic Acid and Homosyringic Acid.

4-Hydroxy-2-[3 : 4-dimethoxyphenylethyl]-quinoline.

See Galipoline.

Hydroxydimethoxypropane.

See under Glycerol.

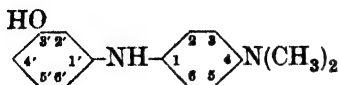
6-Hydroxy-7 : 8-dimethoxy-1 : 2 : 3 : 4-tetrahydroisoquinoline.

See Anhalamine.

3-Hydroxy-4 : 5-dimethoxytoluene.

See Iridol.

3'-Hydroxy-4-dimethylaminodiphenylamine



$C_{14}H_{16}ON_2$

MW, 228

α -Hydroxy- β -dimethylaminopropylbenzene

Leaflets from H_2O . M.p. 99°. Very sol. EtOH, Et_2O , Me_2CO . Sol. $CHCl_3$, C_6H_6 . Insol. cold H_2O , ligroin.

B, HCl : needles. M.p. 207°.

B_2, H_2SO_4 : prisms. M.p. 193°.

O : N-Diacetyl : needles. M.p. 101°. Very sol. EtOH, Et_2O , AcOEt, Me_2CO , C_6H_6 . Insol. ligroin.

O : N-Dibenzoyl : m.p. 112°. Very sol. EtOH, AcOEt, Me_2CO , C_6H_6 , toluene. Insol. Et_2O , ligroin.

Methiodide : needles. M.p. 199.5–200°. Very sol. EtOH, hot H_2O , Py. Insol. Et_2O , C_6H_6 .

Ethiodide : m.p. 180°. Very sol. EtOH, hot H_2O , $CHCl_3$. Spar. sol. Et_2O , C_6H_6 .

N-Nitroso : needles. M.p. 125.5°.

Gnehm, Weber, *Ber.*, 1902, 35, 3087; *J. prakt. Chem.*, 1904, 69, 232.

4'-Hydroxy-4-dimethylaminodiphenylamine.

Prisms from C_6H_6 . M.p. 161–2°. Very sol. EtOH, Et_2O , AcOH, hot C_6H_6 . Spar. sol. H_2O .

O : N-Diacetyl : needles from EtOH.Aq. M.p. 131°. Very sol. EtOH, AcOEt, toluene. Spar. sol. Et_2O . Insol. H_2O .

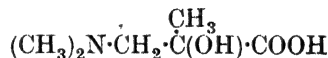
O : N-Dibenzoyl : plates from toluene. M.p. 210°. Sol. EtOH, C_6H_6 . Insol. Et_2O , H_2O , pet. ether.

Methiodide : needles from H_2O . M.p. 218°.

Ethiodide : needles. M.p. 206°.

Gnehm, Bots, *Ber.*, 1902, 35, 3086; *J. prakt. Chem.*, 1904, 69, 164.

1-Hydroxy-2-dimethylaminoisobutyric Acid



$C_6H_{13}O_3N$

MW, 147

Hygroscopic plates from EtOH- Me_2CO . M.p. 174°. Very sol. H_2O , EtOH. Spar. sol. Me_2CO . Insol. Et_2O . Neutral to litmus. Sweet taste.

Me ester : $C_7H_{15}O_3N$. MW, 161. B.p. 107–8°/35 mm., 84°/20 mm.

Et ester : $C_8H_{17}O_3N$. MW, 175. B.p. 108°/32 mm., 85°/15 mm. Sol. H_2O and org. solvents.

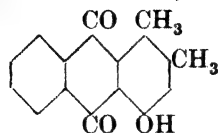
Amide : $C_6H_{14}O_2N_2$. MW, 146. Needles. M.p. 102°. Very sol. H_2O , EtOH, hot Me_2CO . Spar. sol. C_6H_6 .

Benzoyl : cryst. from EtOH. M.p. 182°.

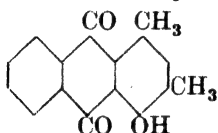
Fourneau, *Bull. soc. chim.*, 1909, 5, 237.

α -Hydroxy- β -dimethylaminopropylbenzene.

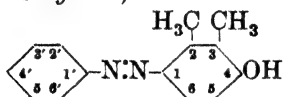
See N-Methylephedrine.

4-Hydroxy-1 : 2-dimethylantraquinone $C_{16}H_{12}O_3$

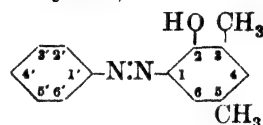
MW, 252

Golden needles from Me_2CO . M.p. 169° .*Acetyl*: yellow needles from EtOH. M.p. 154° .Fairbourn, Gauntlett, *J. Chem. Soc.*, 1923, 123, 1139.Fairbourn, Foster, *J. Chem. Soc.*, 1930, 1276.**4-Hydroxy-1 : 3-dimethylantraquinone** $C_{16}H_{12}O_3$

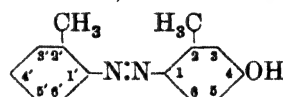
MW, 252

Prismatic needles from AcOH. M.p. $173-5^\circ$.*Me ether*: $C_{17}H_{14}O_3$. MW, 266. Cryst. from AcOH. M.p. $176-7^\circ$. Sol. AcOH. Spar. sol. EtOH, C_6H_6 .Bentley, Gardner, Weizmann, *J. Chem. Soc.*, 1907, 71, 1635.**4-Hydroxy-2 : 3-dimethylazobenzene (6-Benzeneazo-o-3-xyleneol)** $C_{14}H_{14}ON_2$

MW, 226

Prisms from ligroin. M.p. $129-30^\circ$. Sol. most org. solvents.*Benzoyl*: red needles from EtOH. M.p. $151-2^\circ$.Auwers, Michaelis, *Ber.*, 1914, 47, 1293.**5-Hydroxy-2 : 4-dimethylazobenzene (6-Benzeneazo-m-4-xyleneol).**Orange-yellow needles from ligroin-pet. ether. M.p. 114° . Sol. MeOH, EtOH, Me_2CO , AcOH, C_6H_6 , hot ligroin.*Benzoyl*: orange needles from EtOH. M.p. 115° . Sol. AcOH. Spar. sol. EtOH.Bamberger, Reber, *Ber.*, 1907, 40, 2264.**4-Hydroxy-2 : 5-dimethylazobenzene (5-Benzeneazo-p-2-xyleneol).**Orange-yellow prisms from ligroin. M.p. 92° . Sol. EtOH, AcOH, C_6H_6 . Spar. sol. ligroin, pet. ether.*Benzoyl*: orange-yellow needles from ligroin. M.p. $136-7^\circ$.Auwers, Michaelis, *Ber.*, 1914, 47, 1289.**4-Hydroxy-2 : 6-dimethylazobenzene (2-Benzeneazo-m-5-xyleneol).**Orange-yellow needles from ligroin. M.p. $104-5^\circ$. Sol. most org. solvents. Spar. sol. ligroin.*Benzoyl*: red needles from MeOH. M.p. $94-5^\circ$. Spar. sol. cold MeOH.Auwers, Michaelis, *Ber.*, 1914, 47, 1291.**2-Hydroxy-3 : 5-dimethylazobenzene (5-Benzeneazo-m-4-xyleneol)** $C_{14}H_{14}ON_2$

MW, 226

Red needles from EtOH. M.p. 90° (175°). Sol. EtOH, Et_2O , AcOH, C_6H_6 , ligroin.*Acetyl*: yellow needles from ligroin. M.p. 68° .Auwers, *Ann.*, 1909, 365, 291, 295.**4-Hydroxy-3 : 5-dimethylazobenzene (5-Benzeneazo-m-2-xyleneol).**Yellow needles from ligroin. M.p. $95-6^\circ$. Sol. most org. solvents.Auwers, Markovits, *Ber.*, 1908, 41, 2340.**4-Hydroxy-2 : 2'-dimethylazobenzene (6-o-Tolueneazo-m-cresol)** $C_{14}H_{14}ON_2$

MW, 226

Red cryst. + H_2O from H_2O . M.p. 83° : anhyd. cryst. from C_6H_6 , m.p. 112° . Sol. EtOH, Et_2O , C_6H_6 .*Et ether*: $C_{16}H_{18}ON_2$. MW, 254. Deep red needles from EtOH. M.p. 64° . Sol. EtOH, Et_2O , C_6H_6 , ligroin.*B, HCl*: m.p. 157° .Farmer, Hantzsch, *Ber.*, 1899, 32, 3099.Jacobson *et al.*, *Ann.*, 1895, 287, 187.**4-Hydroxy-3 : 2'-dimethylazobenzene (5-o-Tolueneazo-o-cresol).**Red prisms from EtOH. M.p. 132° . Sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O .*Et ether*: $C_{16}H_{18}ON_2$. MW, 254. Red cryst. from ligroin. M.p. $35-7^\circ$. Sol. EtOH. Spar. sol. Et_2O .Noelting, Werner, *Ber.*, 1890, 23, 3259.

4-Hydroxy-2 : 3'-dimethylazobenzene (6-m-Tolueneazo-m-cresol).

Orange plates from C_6H_6 . M.p. 106-7°. Sol. Et_2O , C_6H_6 , ligroin. Spar. sol. EtOH.

Et ether: $C_{16}H_{18}ON_2$. MW, 254. Red prisms from EtOH. M.p. 73°. Sol. most org. solvents.

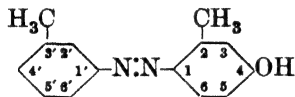
Jacobson *et al.*, *Ann.*, 1895, 287, 187.

4-Hydroxy-2 : 4'-dimethylazobenzene (6-p-Tolueneazo-m-cresol),

Prisms from C_6H_6 . M.p. 135°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin.

Et ether: $C_{16}H_{18}ON_2$. MW, 254. Orange-red plates from EtOH. M.p. 64°. Sol. EtOH, Et_2O , C_6H_6 , ligroin.

Jacobson *et al.*, *Ann.*, 1895, 287, 189.

4-Hydroxy-3 : 3'-dimethylazobenzene (5-m-Tolueneazo-o-cresol)

$C_{14}H_{14}ON_2$ MW, 226

Golden needles from C_6H_6 . M.p. 115°. Sol. EtOH, Et_2O , C_6H_6 .

Et ether: $C_{16}H_{18}ON_2$. MW, 254. Reddish-yellow plates from EtOH. M.p. 46-7°. Sol. EtOH, Et_2O , C_6H_6 .

Jacobson *et al.*, *Ann.*, 1895, 287, 185.

4-Hydroxy-3 : 4'-dimethylazobenzene (5-p-Tolueneazo-o-cresol).

Orange cryst. M.p. 163°. Sol. most org. solvents.

Et ether: $C_{16}H_{18}ON_2$. MW, 254. Orange-yellow needles. M.p. 73-4°. B.p. 251°/42 mm.

Noelting, Werner, *Ber.*, 1890, 23, 3261.

6-Hydroxy-3 : 4'-dimethylazobenzene (3-p-Tolueneazo-p-cresol).

Red cryst. from toluene. M.p. 112-13°. Sol. hot EtOH, Et_2O , $CHCl_3$. Spar. sol. cold EtOH.

Et ether: red needles from EtOH. M.p. 43°. B.p. 253-5°/63 mm.

Acetyl: yellow needles from AcOH. M.p. 91°. *Propionyl*: dark red leaflets from ligroin.

M.p. 62°. Sol. EtOH, C_6H_6 . Spar. sol. EtOH, AcOH, ligroin.

Benzoyl: yellow needles from EtOH. M.p. 95°.

Noelting, Kohn, *Ber.*, 1884, 17, 354.

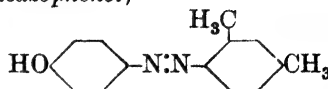
Jacobson, Piepenbrink, *Ber.*, 1894, 27, 2706.

2-Hydroxy-4 : 4'-dimethylazobenzene (4-p-Tolueneazo-m-cresol).

Orange-red cryst. from ligroin. M.p. 148°. Sol. hot ligroin. Spar. sol. alkalis.

Benzoyl: orange needles from ligroin. M.p. 93°. Sol. cold EtOH, hot C_6H_6 .

McPherson, Boord, *J. Am. Chem. Soc.*, 1911, 33, 1531.

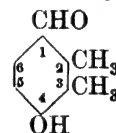
4-Hydroxy-2 : 4-dimethylazobenzene (p-4-m-Xyleneazophenol)

$C_{14}H_{14}ON_2$ MW, 226

Brown prisms from C_6H_6 . M.p. 134°. Sol. EtOH, Et_2O .

Et ether: p-4-m-xyleneazophenetole. $C_{16}H_{18}ON_2$. MW, 254. Red needles from EtOH. M.p. 97°. Spar. sol. EtOH.

Jacobson, *Ann.*, 1895, 287, 211.

4-Hydroxy-2 : 3-dimethylbenzaldehyde (2 : 3-Dimethyl-p-hydroxybenzaldehyde, 3-hydroxy-6-aldehydo-o-xylene, 6-aldehydo-o-3-xyleneol)

$C_9H_{10}O_2$ MW, 150

Plates from toluene. M.p. 172°.

Azine: yellow needles from EtOH. M.p. 254°.

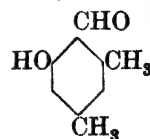
Phenylhydrazone: plates from EtOH.Aq. M.p. 165°.

Gattermann, *Ann.*, 1907, 357, 326.

6-Hydroxy-2 : 3-dimethylbenzaldehyde (5 : 6-Dimethyl-o-hydroxybenzaldehyde, 5 : 6-dimethylsalicylaldehyde, 4-hydroxy-3-aldehydo-o-xylene, 3-aldehydo-o-4-xyleneol).

Needles from pet. ether. M.p. 72°.

Clayton, *J. Chem. Soc.*, 1910, 97, 1404.

6-Hydroxy-2 : 4-dimethylbenzaldehyde (4 : 6-Dimethylsalicylaldehyde, 5-hydroxy-6-aldehydo-m-xylene, 4-aldehydo-m-5-xyleneol)

$C_9H_{10}O_2$ MW, 150

Needles from MeOH.Aq. M.p. 48-9°. Very sol. most org. solvents. Sol. alkalis with yellow col. Volatile in steam.

Me ether: $C_{10}H_{12}O_2$. MW, 164. Needles from MeOH. M.p. 48-9°.

Oxime: needles from EtOH.Aq. M.p. 130°.

Semicarbazone: cryst. powder from AcOH. M.p. 240°.

Phenylhydrazone: needles from pet. ether. M.p. 126.5-127°.

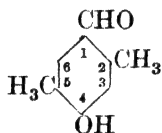
Anil: yellow needles from MeOH. M.p. 88.5-89°.

Auwers, Saurwein, *Ber.*, 1922, 55, 2379.

Lindemann, Pickert, *Ann.*, 1927, 456, 280.

4-Hydroxy-2 : 5 - dimethylbenzaldehyde

(2 : 5-Dimethyl-p-hydroxybenzaldehyde, 2-hydroxy-5-aldehydo-p-xylene, 5-aldehydo-p-2-xyleneol)



$C_9H_{10}O_2$ MW, 150

Needles from H_2O . M.p. 132-3° (129-30°).

Oxime: needles from H_2O . M.p. 155°.

Phenylhydrazone: plates from AcOH.Aq. M.p. 164°.

Azine: yellow needles from EtOH. M.p. 280° decomp.

Gattermann, *Ann.*, 1907, 357, 323.

Auwers, Winternitz, *Ber.*, 1902, 35, 470.

6-Hydroxy - 2 : 5 - dimethylbenzaldehyde

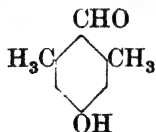
(3 : 5-Dimethylsalicylaldehyde, 2-hydroxy-3-aldehydo-p-xylene, 3-aldehydo-p-2-xyleneol).

Yellow needles. M.p. 62-3°.

Anselmino, *Ber.*, 1902, 35, 4108.

4-Hydroxy - 2 : 6 - dimethylbenzaldehyde

(2 : 6-Dimethyl-p-hydroxybenzaldehyde, 5-hydroxy-2-aldehydo-m-xylene, 2-aldehydo-m-5-xyleneol)



$C_9H_{10}O_2$ MW, 150

Needles from EtOH. M.p. 189-90°.

Me ether: 2 : 6 - dimethylanisaldehyde. $C_{10}H_{12}O_2$. MW, 164. Needles. M.p. 45-7°.

B.p. 271-2°. *Oxime*: plates. M.p. 121-5°.

Et ether: $C_{11}H_{14}O_2$. MW, 178. Oil. B.p. 279-80°. *Oxime*: needles from H_2O . M.p. 100°.

Oxime: plates from EtOH.Aq. M.p. 196°.

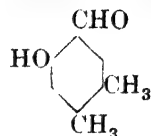
Azine: yellow needles from EtOH. M.p. 240°.

Gattermann, *Ann.*, 1907, 357, 328.

Auwers, Borsche, *Ber.*, 1915, 48, 1714.

6-Hydroxy - 3 : 4 - dimethylbenzaldehyde

(4 : 5-Dimethylsalicylaldehyde, 5-hydroxy-4-aldehydo-o-xylene, 5-aldehydo-o-4-xyleneol)



$C_9H_{10}O_2$ MW, 150

(Cryst. from EtOH. M.p. 71°. Sol. alkalis and most org. solvents.

Azine: yellow cryst. powder. M.p. 317° decomp.

Phenylhydrazone: needles from EtOH.Aq. M.p. 195°.

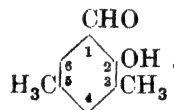
Auwers, *Ber.*, 1899, 32, 3598.

Clayton, *J. Chem. Soc.*, 1910, 97, 1404.

See also first reference above.

2-Hydroxy - 3 : 5 - dimethylbenzaldehyde

(3 : 5-Dimethyl-o-hydroxybenzaldehyde, 3 : 5-dimethylsalicylaldehyde, 4-hydroxy-5-aldehydo-m-xylene, 5-aldehydo-m-4-xyleneol)



$C_9H_{10}O_2$ MW, 150

M.p. about 15°. B.p. 222°.

Oxime: needles. M.p. 138.5-139.5°.

Bamberger, Weiler, *J. prakt. Chem.*, 1898, 58, 351.

4-Hydroxy - 3 : 5 - dimethylbenzaldehyde

(3 : 5-Dimethyl-p-hydroxybenzaldehyde, 2-hydroxy-5-aldehydo-m-xylene, 5-aldehydo-m-2-xyleneol, p-hydroxymesitylenic aldehyde).

Leaflets. M.p. 115-16° (113.5-114°). Sol. hot H_2O , AcOH.

Benzoyl: m.p. 105°. *Phenylhydrazone*: m.p. 184°.

Me ether: 3 : 5 - dimethylanisaldehyde. $C_{10}H_{12}O_2$. MW, 164. B.p. 257°.

Et ether: $C_{11}H_{14}O_2$. MW, 178. B.p. 265.5°.

Oxime: needles. M.p. 169.5°. *Hydrochloride*: m.p. 157°.

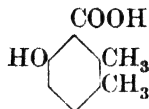
Phenylhydrazone: cryst. from MeOH.Aq. M.p. 143°.

Azine: yellow needles. M.p. 262°.

Gattermann, *Ann.*, 1907, 357, 363.

Thiele, Eichwede, *Ann.*, 1900, 311, 367.

6-Hydroxy-2 : 3-dimethylbenzoic Acid
(5 : 6-Dimethylsalicylic acid, o-4-xyleneol-3-carboxylic acid)

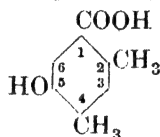
C₉H₁₀O₃

MW, 166

Needles from EtOH.Aq. M.p. 142-3°.

Clayton, *J. Chem. Soc.*, 1910, **97**, 1405.

5-Hydroxy-2 : 4-dimethylbenzoic Acid
(m-4-Xyleneol-6-carboxylic acid)

C₉H₁₀O₃

MW, 166

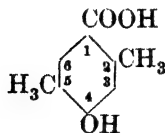
Needles from toluene. M.p. 170-1°. Sol. EtOH, AcOH, Me₂CO, hot toluene, hot C₆H₆. Insol. CHCl₃, pet. ether.*Acetyl* : needles from Me₂CO-pet. ether. M.p. 134°.Meldrum, Kapadia, *J. Indian Chem. Soc.*, 1932, **9**, 490.

6-Hydroxy-2 : 4-dimethylbenzoic Acid
(4 : 6-Dimethylsalicylic acid, m-5-xyleneol-4-carboxylic acid).

M.p. 166°.

Nitrile : 5-hydroxy-4-cyano-m-xylene. C₉H₇ON. MW, 147. Needles from H₂O. M.p. 177-8°. Very sol. MeOH, EtOH, AcOH. Spar. sol. C₆H₆. *Acetyl* : white cryst. M.p. 49-50°.*Me ether* : C₁₀H₁₂O₃. MW, 180. Plates. M.p. 167.5-168°. Very sol. hot H₂O, EtOH. Spar. sol. C₆H₆. Insol. ligroin. *Me ester* : C₁₁H₁₄O₃. MW, 194. B.p. 261-3°.Bayer, D.R.P., 254,122, (*Chem. Zentr.*, 1913, I, 133).Auwers, Saurwein, *Ber.*, 1922, **55**, 2380.

4-Hydroxy-2 : 5-dimethylbenzoic Acid
(4-Hydroxyisoxylic acid, p-2-xyleneol-5-carboxylic acid)

C₉H₁₀O₃

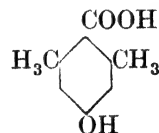
MW, 166

Cryst. from H₂O. M.p. 182-4°.*Nitrile* : 2-hydroxy-5-cyano-p-xylene. C₉H₇ON. MW, 147. Cryst. from CHCl₃. M.p. 163-5°.*Me ether* : 2 : 5-dimethylanisic acid. C₁₀H₁₂O₃. MW, 180. Plates from 50% AcOH. M.p. 163-5°.Houben, Fischer, *Ber.*, 1930, **63**, 2461, 2469.Clemo, Haworth, Walton, *J. Chem. Soc.*, 1929, 2377.

6-Hydroxy-2 : 5-dimethylbenzoic Acid
(6-Hydroxyisoxylic acid, p-2-xyleneol-3-carboxylic acid).

Silky needles from H₂O. M.p. 195°. Volatile in steam. Very sol. EtOH, Et₂O. FeCl₃ → bluish-violet col.Stollé, Knebel, *Ber.*, 1921, **54**, 1220.

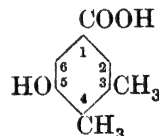
4-Hydroxy-2 : 6-dimethylbenzoic Acid
(4-Hydroxy-m-xylic acid, m-5-xyleneol-2-carboxylic acid)

C₉H₁₀O₃

MW, 166

Plates from H₂O. M.p. 185° decomp. Very sol. EtOH. Spar. sol. C₆H₆, CHCl₃. FeCl₃ → brown col.*Et ester* : C₁₁H₁₄O₃. MW, 194. Plates from EtOH. M.p. 98°.*Me ether nitrile* : 2 : 6-dimethylanisonitrile. C₁₀H₁₁ON. MW, 161. M.p. 85-7°.Rabe, Spence, *Ann.*, 1905, **342**, 351.Houben, Fischer, *Ber.*, 1930, **63**, 2470.

5-Hydroxy-3 : 4-dimethylbenzoic Acid
(5-Hydroxy-o-xylic acid, o-3-xyleneol-5-carboxylic acid)

C₉H₁₀O₃

MW, 166

Plates from AcOH. M.p. 203-4°. Sublimes partially undecomp. Readily sol. EtOH, Et₂O. Mod. sol. AcOH, H₂O. Spar. sol. CHCl₃, pet. ether, CS₂, C₆H₆.*Me ester* : C₁₀H₁₂O₃. MW, 180. Cryst. from C₆H₆. M.p. 148-9°.*Et ester* : C₁₁H₁₄O₃. MW, 194. Needles from pet. ether. M.p. 134-5°.*Acetyl* : needles from C₆H₆. M.p. 141-2°.*Me ether* : cryst. from 50% EtOH. M.p. 170-1°.

Et ether : prismatic needles from MeOH. M.p. 173–4°. *Et ester* : prisms from MeOH.Aq. M.p. 50–1°.

Perkin, *J. Chem. Soc.*, 1899, 75, 187.

6-Hydroxy-3 : 4-dimethylbenzoic Acid
(4 : 5-Dimethylsalicylic acid, 6-hydroxy-o-xylic acid, o-4-xylenol-5-carboxylic acid).

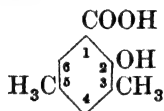
Prisms from EtOH.Aq. M.p. 199°. Very sol. EtOH, Et₂O, CHCl₃. Spar. sol. H₂O. Slightly volatile in steam. FeCl₃ → intense bluish-violet col.

Me ether : needles from MeOH. M.p. 142.5–143.5°. Very sol. EtOH, C₆H₆. Sol. Et₂O, pet. ether. Spar. sol. ligroin.

Auwers, Risse, *Ber.*, 1931, 64, 2221.

Clayton, *J. Chem. Soc.*, 1910, 97, 1404.

2-Hydroxy-3 : 5-dimethylbenzoic Acid
(3 : 5-Dimethylsalicylic acid, 2-hydroxy-sym.-m-xylic acid, m-4-xylenol-5-carboxylic acid)



C₉H₁₀O₃

MW, 166

Needles from EtOH.Aq. M.p. 179°. Very sol. EtOH, Et₂O, CHCl₃. Spar. sol. H₂O. Slightly volatile in steam. Sublimes in needles. FeCl₃ → blue col.

Jacobsen, *Ann.*, 1879, 195, 274 : *Ber.*, 1881, 14, 44.

4-Hydroxy-3 : 5-dimethylbenzoic Acid
(4-Hydroxymesitylenic acid, 4-hydroxy-sym.-m-xylic acid, m-2-xylenol-5-carboxylic acid).

Needles from H₂O. M.p. 218° (223°). Sublimes. Very sol. EtOH, Et₂O. Insol. H₂O, CHCl₃.

Me ester : C₁₀H₁₂O₃. MW, 180. Needles from H₂O. M.p. 130°.

Et ester : C₁₁H₁₄O₃. MW, 194. Prisms from EtOH. M.p. 113°.

Nitrile : 2-hydroxy-5-cyano-m-xylene. C₉H₈ON. MW, 147. Needles from ligroin. M.p. 126°. *Acetyl* : needles from ligroin. M.p. 98°.

Thiele, Eichwede, *Ann.*, 1900, 311, 372.

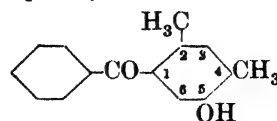
Jacobsen, *Ber.*, 1879, 12, 606.

α-Hydroxydimethylbenzoic Acid.

See Hydroxymethyl-toluic Acid.

5-Hydroxy-2 : 4-dimethylbenzophenone

(Phenyl 5-hydroxy-2 : 4-dimethylphenyl ketone, 6-benzoyl-m-4-xylenol)



C₁₅H₁₄O₂

MW, 226

Colourless needles from C₆H₆-ligroin. M.p. 140–1°. Very sol. Et₂O, EtOH, C₆H₆. Spar. sol. ligroin.

Oxime : needles from C₆H₆. M.p. 182–3°. Very sol. Et₂O, EtOH. Spar. sol. C₆H₆, ligroin.

Me ether : C₁₆H₁₆O₂. MW, 240. Oil. B.p. 199–200°/12–13 mm. *Oximes* : (α) M.p. 138–9°, b.p. 218°/10 mm. (β) M.p. 119–20°.

Et ether : C₁₇H₁₈O₂. MW, 254. Oil. B.p. 190–1°/10 mm. *Oximes* : (α) M.p. 148–9°. (β) M.p. 133–4°.

Meisenheimer, Haussen, Wächterowitz, *J. prakt. Chem.*, 1928, 119, 325.

4-Hydroxy-2 : 5-dimethylbenzophenone
(Phenyl 4-hydroxy-2 : 5-dimethylphenyl ketone, 5-benzoyl-p-2-xylenol).

Needles from C₆H₆-ligroin. M.p. 166–7°. Very sol. Et₂O, EtOH, C₆H₆. Spar. sol. ligroin.

Acetyl : m.p. 62–62.5°.

Me ether : C₁₆H₁₆O₂. MW, 240. Needles from pet. ether. M.p. 60–1°. B.p. 202–4°/12–13 mm.

Meisenheimer, Haussen, Wächterowitz, *J. prakt. Chem.*, 1928, 119, 342.

2-Hydroxy-3 : 5-dimethylbenzophenone
(Phenyl 2-hydroxy-3 : 5-dimethylphenyl ketone, 5-benzoyl-m-4-xylenol).

Oil. B.p. 202°/20 mm.

Oxime : m.p. 153–4°.

Meisenheimer, Haussen, Wächterowitz, *J. prakt. Chem.*, 1928, 119, 338.

4-Hydroxy-3 : 5-dimethylbenzophenone
(Phenyl 4-hydroxy-3 : 5-dimethylphenyl ketone, 5-benzoyl-m-2-xylenol).

Plates from AcOH.Aq. M.p. 141–2°. Very sol. EtOH, AcOH. Spar. sol. C₆H₆, ligroin.

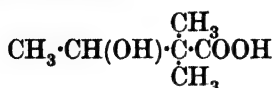
Me ether : C₁₆H₁₆O₂. MW, 240. Cryst. M.p. 44°.

Auwers, Markovits, *Ber.*, 1908, 41, 2339.

Auwers, Janssen, *Ann.*, 1930, 488, 44.

3-Hydroxy-2 : 2-dimethylbutane.

See Methyl-tert.-butylcarbinol.

2-Hydroxy-1 : 1-dimethylbutyric Acid
(1 : 1 : 2-Trimethylhydracrylic acid) $\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

Hygroscopic cryst. M.p. 34° (31°). B.p. $150^\circ/22$ mm., $148^\circ/15$ mm. $k = 2.2 \times 10^{-5}$. Very sol. H_2O , EtOH, Et_2O . Sol. hot ligroin.

Et ester: $\text{C}_8\text{H}_{16}\text{O}_3$. MW, 160. B.p. $194-5^\circ$, $93-4^\circ/18$ mm., $91^\circ/13$ mm. $D_0^{20} 0.9974$. Very sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O . *Acetyl*: b.p. $110^\circ/24$ mm.

Anhydride: $\text{C}_{12}\text{H}_{22}\text{O}_5$. MW, 246. B.p. $200-3^\circ/15$ mm.

Lactone: $\text{C}_6\text{H}_{10}\text{O}_2$. MW, 114. B.p. $63-5^\circ/14$ mm.

Acetyl: cryst. from pet. ether. M.p. 58° . B.p. $147^\circ/12$ mm.

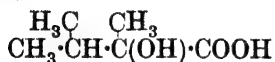
Salkowski, *J. prakt. Chem.*, 1923, 106, 263.

Courtot, *Bull. soc. chim.*, 1906, 35, 114.

Bouveault, *Bull. soc. chim.*, 1899, 21, 1063.

2'-Hydroxy-1 : 1-dimethylbutyric Acid.

See 1-Methyl-1-ethylhydracrylic Acid.

1-Hydroxy-1 : 2-dimethylbutyric Acid
(1 : 2 : 2-Trimethyl-lactic acid, 1-hydroxy-1-methylisovaleric acid) $\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

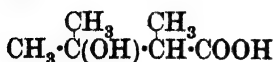
Cryst. M.p. $75-7^\circ$ (63°). Very sol. H_2O , EtOH, Et_2O . $k = 1.35 \times 10^{-4}$ at 25° .

Nitrile: methyl isopropyl ketone cyanhydrin. $\text{C}_6\text{H}_{11}\text{ON}$. MW, 113. B.p. $182^\circ/764$ mm., $97^\circ/19$ mm. $D_0^{18} 0.9249$. $n_D^{18} 1.42885$. Sol. EtOH, Et_2O . Insol. H_2O . *Acetyl*: b.p. $212^\circ/764$ mm. $D_0^{18} 0.9750$. Insol. H_2O .

Perkin, *J. Chem. Soc.*, 1896, 69, 1486.

Pomeranz, *Monatsh.*, 1897, 18, 577.

Henry, *Chem. Zentr.*, 1899, I, 195.

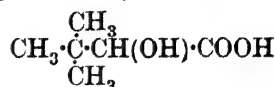
2-Hydroxy-1 : 2-dimethylbutyric Acid
(2-Hydroxy-1-methylisovaleric acid, 1 : 2 : 2-trimethylhydracrylic acid) $\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

Oil. Decomp. on boiling to trimethylacrylic acid. $k = 3.33 \times 10^{-5}$.

Et ester: $\text{C}_8\text{H}_{16}\text{O}_3$. MW, 160. B.p. $189-189.5^\circ/746$ mm., $105^\circ/30$ mm.

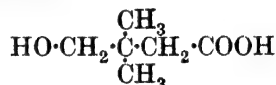
Perkin, Thorpe, *J. Chem. Soc.*, 1896, 69, 1482.

Ewan, *J. Chem. Soc.*, 1896, 69, 1483.

1-Hydroxy-2 : 2-dimethylbutyric Acid
(2 : 2 : 2-Trimethyl-lactic acid, 1-hydroxy-2 : 2 : 2-trimethylpropionic acid) $\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

Cryst. from H_2O . M.p. $87-8^\circ$. Very sol. H_2O , Et_2O .

Glücksman, *Monatsh.*, 1889, 10, 779; 1891, 12, 356.

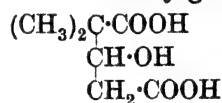
3-Hydroxy-2 : 2-dimethylbutyric Acid
(2-Hydroxymethyl-isovaleric acid) $\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

Lactone: $\text{C}_6\text{H}_{10}\text{O}_2$. MW, 114. Cryst. mass. M.p. $55-7^\circ$. B.p. $207-8^\circ$. Volatile in steam.

Windaus, Klanhardt, *Ber.*, 1921, 54, 587.

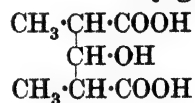
Hydroxy-dimethylcyclohexane.

See Dimethylcyclohexanol.

2-Hydroxy-1 : 1-dimethylglutaric Acid $\text{C}_7\text{H}_{12}\text{O}_5$ MW, 176

Prisms from H_2O . M.p. $158-60^\circ$. Very sol. H_2O , EtOH. Spar. sol. Et_2O , ligroin, C_6H_6 .

Perkin, Smith, *J. Chem. Soc.*, 1903, 83, 12.

2-Hydroxy-1 : 3-dimethylglutaric Acid $\text{C}_7\text{H}_{12}\text{O}_5$ MW, 176

Exists in two forms, solid and liquid.

Solid form:

Needles from Me_2CO . M.p. $136-7^\circ$. Very sol. H_2O , Et_2O , EtOH, Me_2CO , AcOH, formic acid. Spar. sol. CS_2 , CHCl_3 , pet. ether, C_6H_6 . $k = 1.08 \times 10^{-4}$ at 25° .

Acetyl: m.p. $120-1^\circ$. Sol. Et_2O , CHCl_3 . Insol. ligroin. $k = 2 \times 10^{-4}$ at 25° .

Et ester: $\text{C}_9\text{H}_{16}\text{O}_5$. MW, 204. Oil. B.p. $270-1^\circ$.

Anhydride : $C_7H_{10}O_4$. MW, 158. M.p. 109–10°.

Liquid form :

Acetyl : cryst. M.p. 82.5–83.5°.

Reformatski, *Chem. Zentr.*, 1898, II, 886.

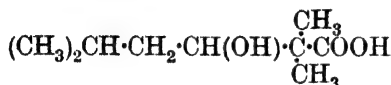
Hydroxydimethylheptane.

See Dimethylheptanol, Dimethyl-*n*-heptyl Alcohol, Di-isobutylcarbinol, and Di-*sec*-butylcarbinol.

Hydroxydimethylhexane.

See Dimethylhexanol and Dimethyl-*n*-hexyl Alcohol.

2-Hydroxy-1 : 1-dimethylisoamylacetic Acid (2-Hydroxy-1 : 1 : 4-trimethylcaproic acid, 2-hydroxy-1 : 1-dimethylisoheptylic acid)



$C_9H_{18}O_3$ MW, 174

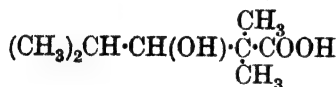
Leaflets from H_2O . M.p. 81°. Sol. EtOH, Et_2O . $k = 1.47 \times 10^{-5}$ at 25°. Dist. with dil. $H_2SO_4 \rightarrow$ lactone.

Et ester : $C_{11}H_{22}O_3$. MW, 202. Oil. B.p. 173–5°/140–5 mm.

Lactone : $C_9H_{16}O_2$. MW, 156. B.p. 221–2°/742 mm.

Coucoulesco, *Chem. Zentr.*, 1924, I, 1354.

2-Hydroxy-1 : 1-dimethylisocaproic Acid (2-Hydroxy-1 : 1 : 3-trimethyl-*n*-valeric acid, 1 : 1-dimethyl-2-isopropylhydracrylic acid)



$C_8H_{16}O_3$ MW, 160

Cryst. M.p. 92°. Very sol. EtOH. Sol. Et_2O . Sol. to 2.03% in H_2O at 19°. $k = 2.2 \times 10^{-5}$ at 25°.

Et ester : $C_{10}H_{20}O_3$. MW, 188. Oil. B.p. 221–2°/738–5 mm., 160°/140 mm.

Reformatski, *Ber.*, 1895, 28, 2842.

Franke, *Monatsh.*, 1896, 17, 675.

Franke, Kohn, *Monatsh.*, 1898, 19, 357.

2-Hydroxy-1 : 2-dimethylisocaproic Acid (2-Hydroxy-1 : 2 : 3-trimethyl-*n*-valeric acid, 1 : 2-dimethyl-2-isopropylhydracrylic acid)



$C_8H_{16}O_3$ MW, 160

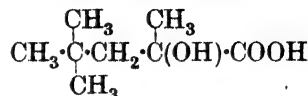
Syrup. B.p. 136–40°/9.5 mm. Spar. sol. H_2O .

Et ester : $C_{10}H_{20}O_3$. MW, 188. B.p. 90–93.5°/11.5 mm. $D_4^{17.5} 0.977$.

Lactone : $C_8H_{14}O_2$. MW, 142. Needles. M.p. 47.5°. B.p. 90.5–93°/10 mm.

Willstätter, Hatt, *Ann.*, 1919, 418, 148.

1-Hydroxy-1 : 3-dimethylisocaproic Acid (1-Hydroxy-1 : 3 : 3-trimethyl-*n*-valeric acid, 1-methyl-2-*tert*-butyl-lactic acid)

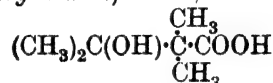


$C_8H_{16}O_3$ MW, 160

Needles or prisms. M.p. 117°. Distills above 300° with part. decomp. Very sol. EtOH, Et_2O . Sol. H_2O .

Butlerow, *Ber.*, 1882, 15, 1575.

2-Hydroxy-1 : 1-dimethylisovaleric Acid (2-Hydroxy-1 : 1 : 2-trimethylbutyric acid, tetramethylhydracrylic acid)



$C_7H_{14}O_3$ MW, 146

Cryst. from ligroin. M.p. 153° decomp. B.p. 192–3°. Very sol. H_2O , EtOH, Et_2O . $k = 4.35 \times 10^{-5}$ at 25°.

Et ester : $C_9H_{18}O_3$. MW, 174. B.p. 196–7°, 91°/17 mm. Very sol. EtOH, Et_2O . Acetyl : b.p. 119°/23 mm.

Reformatski, Plesconossow, *Ber.*, 1895, 28, 2839.

4-Hydroxy-2 : 6-dimethyloctane.

See Isobutyl-activeamylcarbinol.

3-Hydroxy-2 : 2-dimethylpentane.

See Ethyl-*tert*-butylcarbinol.

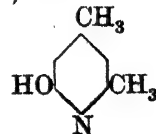
2-Hydroxy-1 : 1-dimethylpropionaldehyde.

See Hydroxypivalic Aldehyde.

2-Hydroxy-1 : 1-dimethylpropionic Acid.

See Hydroxypivalic Acid.

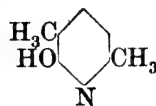
6-Hydroxy-2 : 4-dimethylpyridine (4 : 6-Dimethyl- α -pyridone, ψ -lutidostyryl, 6-hydroxy- α -lutidine, α -lutidone)



C_7H_9ON MW, 123

Cryst. from H_2O . M.p. 180°. Sublimes in needles. Very sol. EtOH, $CHCl_3$. Sol. hot H_2O . Spar. sol. cold H_2O , Et_2O , ligroin, C_6H_6 .

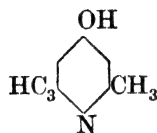
Knoevenagel, Cremer, *Ber.*, 1902, 35, 2395.

6-Hydroxy-2 : 5-dimethylpyridine (3 : 6-Dimethyl- α -pyridone, 6-hydroxy- $\alpha\beta'$ -lutidine) C_7H_9ON

MW, 123

Cryst. + $\frac{1}{2}H_2O$ from H_2O . M.p. anhyd. 138° . Very sol. EtOH, H_2O . $FeCl_3 \rightarrow$ red-dish-violet col.

Errera, *Ber.*, 1901, **34**, 3696.

4-Hydroxy-2 : 6-dimethylpyridine (2 : 6-Dimethyl- γ -pyridone, γ -lutidone, 4-hydroxy- $\alpha\alpha'$ -lutidine) C_7H_9ON

MW, 123

Cryst. from H_2O . M.p. $227.5-229^\circ$ (225°). B.p. $349-51^\circ$. Very sol. H_2O , EtOH. Spar. sol. Et_2O , $CHCl_3$, C_6H_6 . $FeCl_3 \rightarrow$ brownish-red col.

Me ether: $C_8H_{11}ON$. MW, 137. B.p. 203° . D_{15}^{25} 1.011.

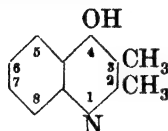
Et ether: $C_9H_{13}ON$. MW, 151. B.p. 215° , $107-8^\circ/19$ mm. D_{25}^{25} 0.9822. n_D^{25} 1.5018. *Methiodide*: cryst. from H_2O . M.p. $195-6^\circ$. *Picrate*: m.p. $113-14^\circ$.

B_2, H_2PtCl_6 : plates from H_2O . M.p. $224-5^\circ$.

Methiodide: prisms from H_2O . M.p. 242° .

Picrate: cryst. from EtOH. M.p. $219-20^\circ$.

Rassweiler, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 2763.

4-Hydroxy-2 : 3-dimethylquinoline (4-Hydroxy-3-methylquinaldine) $C_{11}H_{11}ON$

MW, 173

Prisms + $1H_2O$ from H_2O . Sublimes at about 300° . M.p. 315° . Spar. sol. EtOH.

Conrad, Limpach, *Ber.*, 1891, **24**, 2991.

Mander-Jones, Trikojus, *Chem. Abstracts*, 1933, **27**, 1350.

5-Hydroxy-2 : 4-dimethylquinoline (5-Hydroxy-4-methylquinaldine).

Brown needles from EtOH. M.p. 200° .

Bülow, Issler, *Ber.*, 1903, **36**, 4017.

Dict. of Org. Comp.—II.

6-Hydroxy-2 : 4-dimethylquinoline (6-Hydroxy-4-methylquinaldine).

Prisms from EtOH. M.p. 214° . Distills with decomp. at 360° . Very sol. Me_2CO . Sol. EtOH. Spar. sol. Et_2O . Insol. H_2O , C_6H_6 . Sol. dil. acids and alkalis. $FeCl_3 \rightarrow$ brown col.

B, HCl: yellow needles from EtOH. Sublimes. *Et ether*: $C_{13}H_{15}ON$. MW, 201. Cryst. from pet. ether. B.p. $314-16^\circ$.

B_2, H_2PtCl_6 : dark yellow needles. Decomp. above 110° . Spar. sol. H_2O , EtOH.

Picrate: yellow plates from EtOH. M.p. 225° decomp. Spar. sol. EtOH, Me_2CO , $CHCl_3$, C_6H_6 .

Engler, Bauer, *Ber.*, 1889, **22**, 214.

Palkin, Harris, *Ind. Eng. Chem.*, 1922, **14**, 704.

Clarke, Taylor, U.S.P., 1,701,144, (*Chem. Abstracts*, 1929, **23**, 1420).

7-Hydroxy-2 : 4-dimethylquinoline (7-Hydroxy-4-methylquinaldine).

Needles from EtOH. M.p. 218° .

Bülow, Issler, *Ber.*, 1903, **36**, 4016.

8-Hydroxy-2 : 4-dimethylquinoline (8-Hydroxy-4-methylquinaldine).

Prisms from Et_2O . M.p. 65° . B.p. 281° . Very sol. EtOH, Me_2CO . Sol. Et_2O , $CHCl_3$, C_6H_6 . Volatile in steam. Sublimes. Br in EtOH \rightarrow yellow cryst. ppt.

B, HCl: yellow plates from EtOH. Sublimes without melting. Very sol. H_2O . Insol. Et_2O .

Picrate: plates or prisms from EtOH. M.p. 207° . Spar. sol. EtOH, Me_2CO , C_6H_6 .

Engler, Bauer, *Ber.*, 1889, **22**, 211.

4-Hydroxy-2 : 6-dimethylquinoline (4-Hydroxy-6-methylquinaldine, 4-hydroxy-p-toluquinaldine).

Cryst. + $1H_2O$ from H_2O . M.p. $274-5^\circ$ anhyd. $FeCl_3 \rightarrow$ brownish-red col.

B_2, H_2PtCl_6 : orange-yellow prisms from H_2O . M.p. 228° .

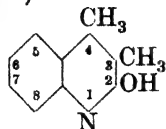
Conrad, Limpach, *Ber.*, 1888, **21**, 525.

4-Hydroxy-2 : 8-dimethylquinoline (4-Hydroxy-8-methylquinaldine, 4-hydroxy-o-toluquinaldine).

Plates + $1H_2O$ from H_2O . M.p. $260-1^\circ$ anhyd. Partly sublimes at m.p. Very sol. EtOH. Spar. sol. H_2O , Et_2O , $CHCl_3$, C_6H_6 .

B_2, H_2PtCl_6 : yellow needles. Decomp. at $250-70^\circ$. Very sol. H_2O , EtOH.

Conrad, Limpach, *Ber.*, 1888, **21**, 524.

2-Hydroxy-3 : 4-dimethylquinoline (3 : 4-Dimethylcarbostyryl)

$C_{11}H_{11}ON$ MW, 173
Cryst. from AcOH. M.p. 266° (262°). Spar. sol. hot NaOH.

Knorr, *Ann.*, 1888, **245**, 359.
Camps, *Arch. Pharm.*, 1899, **237**, 676.

2-Hydroxy-4 : 6-dimethylquinoline (4 : 6-Dimethylcarbostyryl).

Prisms from EtOH. M.p. 249–50°. Sol. hot EtOH. Spar. sol. H_2O , Et_2O , $CHCl_3$, ligroin, C_6H_6 . Sol. alkalis and dil. acids. Salts hyd. by H_2O .

Knorr, *Ann.*, 1888, **245**, 365.
Ewins, King, *J. Chem. Soc.*, 1913, **103**, 110.

2-Hydroxy-4 : 7-dimethylquinoline (4 : 7-Dimethylcarbostyryl).

Cryst. from AcOH.Aq. M.p. 220°. Spar. sol. hot H_2O . Insol. cold H_2O . Salts hyd. by H_2O . Chloroplatinate : yellow needles from HCl. M.p. 233–4°.

Knorr, *Ann.*, 1888, **245**, 370.
Ewins, King, *J. Chem. Soc.*, 1913, **103**, 109.

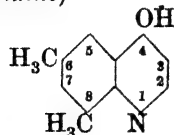
2-Hydroxy-4 : 8-dimethylquinoline (4 : 8-Dimethylcarbostyryl).

Plates from AcOH.Aq. M.p. 217–18°. Spar. sol. cold H_2O , more sol. hot. Salts hyd. by H_2O .

Ewins, King, *J. Chem. Soc.*, 1913, **103**, 107.

2-Hydroxy-6 : 8-dimethylquinoline.

See Cytisoline.

4-Hydroxy-6 : 8-dimethylquinoline (4-Hydroxy- β -cytisolidine)

$C_{11}H_{11}ON$ MW, 173
Needles from H_2O . M.p. 219–21°.

Späth, *Monatsh.*, 1919, **40**, 111.

5-Hydroxy-6 : 8-dimethylquinoline (5-Hydroxy- β -cytisolidine).

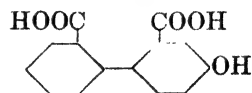
Plates from $CHCl_3$. M.p. 197–8°. Very sol.

EtOH. Sol. hot H_2O , $CHCl_3$, C_6H_6 . Sublimes in needles.

Noelting, Trautmann, *Ber.*, 1890, **23**, 3683.

 α -Hydroxydinaphthylmethane.

See Dinaphthylcarbinol.

4-Hydroxydiphenic Acid (4-Hydroxydiphenyl-2 : 2'-dicarboxylic acid)

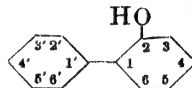
$C_{14}H_{10}O_5$ MW, 258

Prisms from H_2O . M.p. 245–6°. Very sol. EtOH, Et_2O . Sol. H_2O . Spar. sol. C_6H_6 .

Schmidt, Schall, *Ber.*, 1905, **38**, 3770.

Hydroxydiphenoxyp propane.

See under Glycerol.

2-Hydroxydiphenyl (o-Phenylphenol)

$C_{12}H_{10}O$ MW, 170

Needles from pet. ether. M.p. 56°. B.p. 275°, 145°/14 mm.

Me ether : $C_{13}H_{12}O$. MW, 184. Prisms from pet. ether. M.p. 29°. B.p. 274°.

Et ether : $C_{14}H_{14}O$. MW, 198. Prisms from pet. ether. M.p. 34°. B.p. 276°.

Acetyl : needles from pet. ether. M.p. 62–3°. B.p. 164–5°/15 mm.

Hirsch, *Ber.*, 1890, **23**, 3710.

Honigschmid, *Monatsh.*, 1901, **22**, 566.

Späth, *Monatsh.*, 1914, **35**, 328.

Auwers, Wittig, *J. prakt. Chem.*, 1924, **108**, 105.

Gesellschaft für Teerverwertung, D.R.P., 492,064, (*Chem. Abstracts*, 1930, **24**, 2475).

Finzi, *Gazz. chim. ital.*, 1931, **61**, 41.

3-Hydroxydiphenyl (m-Phenylphenol).

Needles from H_2O or pet. ether. M.p. 78° (75°). Sol. EtOH, C_6H_6 . Spar. sol. H_2O , pet. ether. Volatile in steam.

Et ether : cryst. M.p. 34°. B.p. 305°. Sol. usual org. solvents.

Benzoyl : plates from EtOH. M.p. 60–1°.

Jacobson, Loeb, *Ber.*, 1903, **36**, 4085.

Errara, La Spada, *Gazz. chim. ital.*, 1905, **35**, 552.

Jacobson, Franz, Hönlgsberger, *Ber.*, 1903, **36**, 4075.

4-Hydroxydiphenyl

4-Hydroxydiphenyl (p-Phenylphenol).

Needles or plates from EtOH.Aq. M.p. 164–5° (160–2°). B.p. 305–8°. Sol. EtOH, Et₂O, CHCl₃. Spar. sol. pet. ether. Spar. volatile in steam. Sublimes.

Me ether: C₁₃H₁₂O. MW, 184. Plates from EtOH. M.p. 90°.

Acetyl: plates from EtOH. M.p. 88–9°.

Benzoyl: cryst. M.p. 121° (150°).

p-Toluenesulphonyl: plates from AcOH. M.p. 177°.

Hirsch, *Ber.*, 1890, **23**, 3708.

Kaiser, *Ann.*, 1890, **257**, 101.

Friebel, Rassow, *J. prakt. Chem.*, 1901, **63**, 453.

Werner, Rekner, *Ann.*, 1902, **322**, 167.

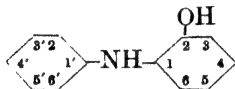
Raiford, Colbert, *J. Am. Chem. Soc.*, 1925, **47**, 1456.

Bell, Kenyon, *J. Chem. Soc.*, 1926, 3049.

Finzi, *Gazz. chim. ital.*, 1931, **61**, 38.

Booth, U.S.P., 1,925,367, (*Chem. Abstracts*, 1933, **27**, 5342).

2-Hydroxydiphenylamine (o-Anilinophenol)



C₁₂H₁₁ON

MW, 185

Prisms from H₂O. M.p. 69–70° (68°). B.p. 180–9°/20 mm. Sol. EtOH, Et₂O, AcOH. Spar. sol. H₂O, C₆H₆. Reduces Fehling's. FeCl₃ → blue-black col.

N-Acetyl: needles from pet. ether. M.p. 144–6°. Very sol. EtOH, Me₂CO, CHCl₃, AcOH, AcOEt. Spar. sol. pet. ether, Et₂O, CS₂, C₆H₆.

Me ether: *N*-phenyl-*o*-anisidine. C₁₃H₁₃ON. MW, 199. B.p. 325–6°/732 mm. (320–5°/730 mm.). Darkens in air. Misc. with EtOH, Et₂O.

Deninger, *J. prakt. Chem.*, 1894, **50**, 89.

Gambarjan, *Ber.*, 1909, **42**, 4012.

Ullmann, Kipper, *Ann.*, 1907, **355**, 344.

Goldberg, D.R.P., 187,870, (*Chem. Zentr.*, 1907, **II**, 1465).

3-Hydroxydiphenylamine (m-Anilino-phenol).

Leaflets from H₂O. M.p. 81.5–82°. B.p. 340°. Very sol. EtOH, Et₂O, Me₂CO. Spar. sol. H₂O, ligroin. Sol. dil. acids and alkalis. Salts hyd. by cold H₂O.

O-Benzoyl: needles from EtOH. M.p. 125.5–126.5°. Very sol. Et₂O, C₆H₆. Sol. EtOH, AcOH. Spar. sol. ligroin.

259 3'-Hydroxydiphenylamine-2-carboxylic Acid

N-Benzoyl: cryst. from EtOH.Aq. M.p. 201°.

Calm, *Ber.*, 1883, **16**, 2787.

Merz, Weith, *Ber.*, 1881, **14**, 2345.

Auwers, *Ann.*, 1909, **384**, 171 (Note).

4-Hydroxydiphenylamine (p-Anilino-phenol).

Leaflets from H₂O. M.p. 73°. B.p. 330°, 215–16°/12 mm. Very sol. EtOH, Et₂O, CHCl₃, warm C₆H₆. Spar. sol. H₂O, ligroin.

O: *N-Diacetyl*: prisms from C₆H₆-ligroin. M.p. 120°. Very sol. EtOH, Et₂O, AcOH, hot C₆H₆.

O-Benzoyl: yellowish-white plates from ligroin. M.p. 114–15°.

O: *N-Dibenzoyl*: yellow prisms from EtOH. M.p. 175°. Sol. Et₂O, AcOH, C₆H₆. Spar. sol. cold EtOH.

p-Toluenesulphonyl: plates from EtOH. M.p. 126–5°. Sol. CHCl₃, C₆H₆. Spar. sol. EtOH, AcOH, petrol.

Me ether: *N*-phenyl-*p*-anisidine. C₁₃H₁₃ON. MW, 199. Prisms from EtOH. M.p. 105°. B.p. 195°/12 mm.

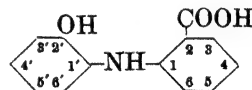
Et ether: *N*-phenyl-*p*-phenetidine. C₁₄H₁₅ON. MW, 213. Needles from ligroin. M.p. 73–4°. B.p. 348°. Very sol. Et₂O, C₆H₆. Spar. sol. ligroin.

Philip, Calm, *Ber.*, 1884, **17**, 2431.

Willstätter, Kubli, *Ber.*, 1909, **42**, 4138.

Bradfield, Cooper, Orton, *J. Chem. Soc.*, 1927, 2856.

2'-Hydroxydiphenylamine-2-carboxylic Acid (N-o-Hydroxyphenylantranilic acid)



C₁₂H₁₁O₃N

MW, 317

Needles from EtOH.Aq. M.p. 190°. Sol. hot EtOH, hot C₆H₆. Spar. sol. cold EtOH, cold C₆H₆, ligroin. Insol. H₂O.

Me ether: C₁₃H₁₃O₃N. MW, 331. Needles from C₆H₆. M.p. 176°. Sol. EtOH, AcOH. Spar. sol. C₆H₆. Heat → 2-methoxydiphenylamine. Conc. H₂SO₄ → 4-methoxyacridone.

Ullmann, Kipper, *Ann.*, 1907, **355**, 342.

3'-Hydroxydiphenylamine-2-carboxylic Acid (N-m-Hydroxyphenylantranilic acid).

Me ether: needles from C₆H₆-ligroin. M.p. 132°. Sol. EtOH, AcOH, C₆H₆. Spar. sol. ligroin. Insol. H₂O.

See above reference.

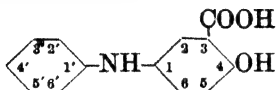
4'-Hydroxydiphenylamine-2-carboxylic Acid 260

4'-Hydroxydiphenylamine-2-carboxylic Acid (N-p-Hydroxyphenylantranilic acid).

Et ether: $C_{14}H_{15}O_3N$. MW, 345. Needles from AcOH.Aq. M.p. 209°. Sol. hot EtOH, AcOH, C_6H_6 . Insol. H_2O , ligroin.

Ullmann, Kipper, *Ann.*, 1907, 355, 344.

4-Hydroxydiphenylamine-3-carboxylic Acid (5-Anilinosalicylic acid)



$C_{12}H_{11}O_3N$ MW, 317

Needles from H_2O . M.p. 217.5°. Sol. hot H_2O , EtOH, Et_2O , $CHCl_3$. Spar. sol. H_2O . $FeCl_3 \rightarrow$ violet col.

Dierbach, *Ann.*, 1893, 273, 120.

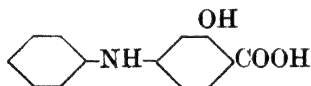
5-Hydroxydiphenylamine-3-carboxylic Acid.

M.p. 220°.

Anilide: m.p. 160-1°.

I.G., E.P., 355,114, (*Chem. Zentr.*, 1931, II, 3663).

3-Hydroxydiphenylamine-4-carboxylic Acid (4-Anilinosalicylic acid)

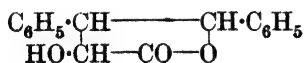


$C_{12}H_{11}O_3N$ MW, 317

Cryst. from EtOH.Aq. M.p. 180-1°. Alc. $FeCl_3 \rightarrow$ red col.

Laska, Haller, D.R.P., 515,208, (*Chem. Zentr.*, 1931, I, 1828).

1-Hydroxy-2:3-diphenylbutyrolactone



$C_{16}H_{14}O_3$ MW, 254

Exists in four forms.

(i) Needles from $CHCl_3$ -ligroin. M.p. 127°. Sol. hot EtOH, $CHCl_3$, C_6H_6 . Spar. sol. H_2O , Et_2O , ligroin.

(ii) Cryst. from EtOH. M.p. 170°. Has same solubilities and chemical reactions as (i).

(iii) Cryst. powder from $CHCl_3$ -ligroin. Sol. hot $CHCl_3$.

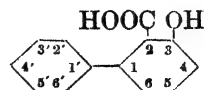
(iv) Needles from EtOH. M.p. 171°. Almost insol. $CHCl_3$.

Erlenmeyer, Lux, *Ber.*, 1898, 31, 2224.

Erlenmeyer, *Ber.*, 1905, 38, 3121.

4'-Hydroxydiphenyl-2-carboxylic Acid

3-Hydroxydiphenyl-2-carboxylic Acid (6-Hydroxy-2-phenylbenzoic acid, 6-phenylsalicylic acid)



$C_{13}H_{10}O_3$

MW, 214

Needles or plates from H_2O . M.p. 195°. Very sol. $CHCl_3$. Volatile in steam. $FeCl_3 \rightarrow$ violet col. $H_2SO_4 \rightarrow$ deep red. col.

Et ester: $C_{15}H_{14}O_3$. MW, 242. Plates from EtOH. M.p. 46-7°.

Heyl, *Ber.*, 1898, 31, 3034; *J. prakt. Chem.*, 1899, 59, 456.

5-Hydroxydiphenyl-2-carboxylic Acid (4-Hydroxy-2-phenylbenzoic acid).

Cryst. from H_2O . M.p. (+ $1H_2O$) 123°, (anhyd.) 147°. Very sol. EtOH. Sol. pet. ether, C_6H_6 . Spar. sol. cold H_2O .

Errera, La Spada, *Gazz. chim. ital.*, 1905, 35, 549.

6-Hydroxydiphenyl-2-carboxylic Acid (3-Hydroxy-2-phenylbenzoic acid).

Cryst. + $1H_2O$ from EtOH. M.p. anhyd. 154°. Very sol. EtOH, Et_2O . Spar. sol. cold H_2O .

Me ester: $C_{14}H_{12}O_3$. MW, 228. Cryst. from Et_2O . M.p. 84-5°. Distils undecomp.

Et ester: $C_{15}H_{14}O_3$. MW, 242. Plates from Et_2O . M.p. 111°.

Amide: $C_{13}H_{11}O_2N$. MW, 213. Needles from EtOH. M.p. 262-3°. Sol. hot EtOH. Spar. sol. H_2O , Et_2O , C_6H_6 .

Graebe, Schestakow, *Ann.*, 1895, 284, 320.

2'-Hydroxydiphenyl-2-carboxylic Acid.

Passes immediately on formation into its lactone.

Lactone: dibenz- α -pyrone, 3:4-benzcoumarin. $C_{13}H_8O_2$. MW, 196. Needles from EtOH. M.p. 92.5°. Distils with slight decomp. Very sol. EtOH, Et_2O .

Richter, *J. prakt. Chem.*, 1883, 28, 294.

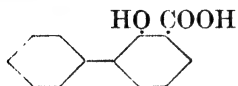
Graebe, Schestakow, *Ann.*, 1895, 284, 308, 317.

4'-Hydroxydiphenyl-2-carboxylic Acid.

Prisms from H_2O . M.p. 206.5° (205°). Sol. hot H_2O . Insol. C_6H_6 .

Griess, *Ber.*, 1888, 21, 981.

Graebe, Schestakow, *Ann.*, 1895, 284, 317, 323.

4'-Hydroxydiphenyl-4-carboxylic Acid.
M.p. 290°.I.G., F.P., 735,846, (*Chem. Abstracts*, 1933, 27, 1001).**2-Hydroxydiphenyl-3-carboxylic Acid** (2-Hydroxy-3-phenylbenzoic acid, 3-phenylsalicylic acid) $C_{13}H_{10}O_3$

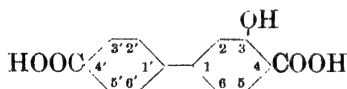
MW, 214

M.p. 180°.

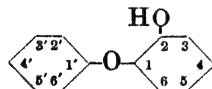
v. Heyden, D.R.P., 61,125.

4-Hydroxydiphenyl-2:2'-dicarboxylic Acid.

See 4-Hydroxydiphenic Acid.

3-Hydroxydiphenyl-4:4'-dicarboxylic Acid $C_{14}H_{10}O_5$

MW, 258

Needles from MeOH or AcOH. M.p. 324-5° decomp. Very sol. EtOH, AcOEt. Almost insol. $CHCl_3$, CS_2 , C_6H_6 .4-Me ester: $C_{15}H_{12}O_5$. MW, 272. Needles from C_6H_6 . M.p. 215-16°. Very sol. EtOH, Et_2O , $CHCl_3$.4'-Me ester: plates from EtOH. M.p. 240-241-5° decomp. Very sol. MeOH, Et_2O , $CHCl_3$, C_6H_6 .Di-Me ester: $C_{16}H_{14}O_5$. MW, 286. Plates or needles from EtOH. M.p. 168°. Acetyl: needles from EtOH.Aq. M.p. 119°.Mudrovčić, *Monatsh.*, 1913, 34, 1432.**2-Hydroxydiphenyl Ether** (*Catechol phenyl ether*) $C_{12}H_{10}O_2$

MW, 186

Needles from H_2O , EtOH, or pet. ether. M.p. 106-7°. B.p. 151-5°/11 mm. Sol. EtOH, hot Et_2O , C_6H_6 , AcOH, CS_2 . Spar. sol. H_2O , pet. ether. Spar. volatile in steam.Me ether: guaiacol phenyl ether. $C_{13}H_{12}O_2$. MW, 200. Needles from ligroin. M.p. 79° (77°). B.p. 288°. Sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O . Spar. volatile in steam.

Acetyl: b.p. 358-60°.

Benzoyl: cryst. M.p. 48-5°.

Norris, Macintire, Corse, *Am. Chem. J.*, 1903, 29, 127.Fichter, Brunner, *Bull. soc. chim.*, 1916, 19, 286.Fritzsche, D.R.P., 269,543, (*Chem. Zentr.*, 1914, I, 591).Lock, *Monatsh.*, 1930, 55, 167.**3-Hydroxydiphenyl Ether** (*Resorcinol phenyl ether*).

B.p. 185°/12 mm., 150°/4-5 mm.

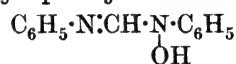
Me ether: b.p. 303°/745 mm.

Klarmann, Gatyas, Shternov, *J. Am. Chem. Soc.*, 1931, 53, 3405.Lock, *Monatsh.*, 1930, 55, 180.**4-Hydroxydiphenyl Ether** (*Hydroquinone phenyl ether*).Needles from H_2O or ligroin. M.p. 84-5°.

B.p. 175-7°/10 mm. Sol. usual org. solvents.

Me ether: b.p. 163-5°/14 mm.

Benzoyl: needles from EtOH or ligroin. M.p. 97-8°.

Häussermann, Bauer, *Ber.*, 1896, 29, 2085.Oesterlin, *Monatsh.*, 1931, 57, 31.Lock, *Monatsh.*, 1930, 55, 183.**2-Hydroxy-1:2-diphenylethylamine.**See α -Hydroxy- β -aminodibenzyl.**N-Hydroxydiphenylformamidine** $C_{13}H_{12}ON_2$

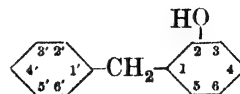
MW, 212

Needles from C_6H_6 , m.p. 130-1° (126-7°): needles + $1H_2O$ from H_2O , m.p. 107-17°. Sol. EtOH, Me_2CO , hot H_2O , $CHCl_3$, C_6H_6 , dil. min. acids. Spar. sol. pet. ether, cold H_2O . Forms metallic salts. Hot dil. $H_2SO_4 \rightarrow$ formic acid + aniline + *p*-aminophenol. Hot $H_2O \rightarrow$ aniline + formylphenylhydroxylamine. $Ac_2O \rightarrow$ diphenylurea.Ley, *Ber.*, 1902, 35, 1452.**5-Hydroxydiphenylene.**

See 5-Hydroxy-2:4'-diaminodiphenyl.

1-Hydroxy-2:2'-diphenylisobutyric Acid.

See Dibenzylglycollic Acid.

2-Hydroxydiphenylmethane (*o-Benzylphenol*) $C_{13}H_{12}O$

MW, 184

Exists in two forms. (i) *Stable*: m.p. 52°.

(ii) *Labile*: m.p. 21°. B.p. 312°, 175°/18 mm.

Me ether: o-benzylanisole. $C_{14}H_{14}O$. MW, 198. M.p. 30°. B.p. 159–60°/12 mm. *Phenylurethane*: cryst. from C_6H_6 . M.p. 115°.

Phenylurethane: needles from ligroin. M.p. 117.5–118°.

Claisen, *Ann.*, 1925, **442**, 239.

Stoermer, Frick, *Ber.*, 1924, **57**, 27.

4-Hydroxydiphenylmethane (*p*-Benzylphenol).

Cryst. from EtOH. M.p. 84°. B.p. 320–2° (325–30°), 198–200°/10 mm. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 , AcOH, caustic alkalis. Mod. sol. hot H_2O .

Me ether: *p*-benzylanisole. $C_{14}H_{14}O$. MW, 198. Cryst. M.p. 20°. B.p. 305°, 177°/10 mm., 157–8°/8 mm.

Et ether: *p*-benzylphenetole. $C_{15}H_{16}O$. MW, 212. Oil. B.p. 317°, 217°/37 mm. D_{24}^{20} 1.038. Volatile in steam.

Acetyl: b.p. 317°. D_4^{20} 1.1168. Decomp. in moist air.

Benzoyl: m.p. 87°.

Clemmensen, *Ber.*, 1914, **47**, 682.

Späth, *Monatsh.*, 1913, **34**, 2007.

Klages, Allendorff, *Ber.*, 1898, **31**, 1001.

Paternò, Fileti, *Gazz. chim. ital.*, 1875, **5**, 382.

α -Hydroxydiphenylmethane.

Benzhydrol, *q.v.*

4-Hydroxydiphenylmethane - 3-carboxylic Acid.

See 5-Benzylsalicylic Acid.

1-Hydroxy-1:1-diphenylpropane (1:1-Diphenylpropyl alcohol, ethyldiphenylcarbinol, α -ethylbenzhydrol, α -hydroxy- α -ethyldiphenylmethane)

$(C_6H_5)_2C(OH) \cdot CH_2 \cdot CH_3$
 $C_{15}H_{16}O$ MW, 212

Cryst. from EtOH. M.p. 95° (91–2°). B.p. 171–3°/14 mm., 175–80°/17 mm.

Et ether: $C_{17}H_{20}O$. MW, 240. Cryst. M.p. 160–1°.

Hell, Bauer, *Ber.*, 1904, **37**, 231.

Schorigin, *Ber.*, 1908, **41**, 2715.

Konowalow, Dobrowolski, *Chem. Zentr.*, 1905, II, 828.

1-Hydroxy-1:2-diphenylpropane (1:2-Diphenylpropyl alcohol, β -hydroxy- α -methyl-diphenyl)

$C_6H_5 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot CH(OH) \cdot C_6H_5$
 $C_{15}H_{16}O$ MW, 212

B.p. 195–200°/20 mm., 180–2°/19 mm.

Tiffeneau, *Ann. chim.*, 1907, **10**, 192, 353.

2-Hydroxy-1:2-diphenylpropane (*Methylphenylbenzylcarbinol*, 1:2-diphenylisopropyl alcohol, α -hydroxy- α -methyl-diphenyl)

$C_6H_5 \cdot \overset{CH_3}{\underset{|}{CH}}(OH) \cdot CH_2 \cdot C_6H_5$
 $C_{15}H_{16}O$ MW, 212

Cryst. from ligroin. M.p. 50–1°. B.p. 289–92°, 175°/15 mm.

Hell, *Ber.*, 1904, **37**, 457.

Sabatier, Murat, *Ann. chim.*, 1915, **4**, 288.

3-Hydroxy-1:2-diphenylpropane (2:3-Diphenylpropyl alcohol, α -hydroxymethyl-diphenyl)

$C_6H_5 \cdot CH_2 \cdot \overset{CH_2OH}{\underset{|}{CH}} \cdot C_6H_5$
 $C_{15}H_{16}O$ MW, 212

Oil. B.p. 300–2°. Sol. EtOH, Et_2O .

Freund, Remse, *Ber.*, 1890, **23**, 2863.

1-Hydroxy-1:3-diphenylpropane (1:3-Diphenylpropyl alcohol)

$C_6H_5 \cdot CH_2 \cdot CH_2 \cdot CH(OH) \cdot C_6H_5$
 $C_{15}H_{16}O$ MW, 212

Viscous oil. B.p. 330–2°, 192–4°/12 mm.

Dieckmann, Kämmerer, *Ber.*, 1906, **39**, 3049.

Bauer, *Compt. rend.*, 1912, **154**, 1094.

2-Hydroxy-1:3-diphenylpropane.

See Diphenylcarbinol.

1-Hydroxy-2:2-diphenylpropane (2:2-Diphenylpropyl alcohol, α -methyl- α -hydroxymethyl-diphenylmethane, α -methylbenzhydrylicarbinol)

$C_6H_5 \cdot \overset{CH_3}{\underset{|}{CH}}(OH) \cdot CH_2 \cdot C_6H_5$
 $C_{15}H_{16}O$ MW, 212

B.p. 186–7°/15 mm. D_{20}^{20} 1.0968, D_{20}^{20} 1.0835.

Acetyl: b.p. 182–3°/14 mm.

Phenylurethane: m.p. 148–9°.

Faworski, Korolew, *Chem. Zentr.*, 1923, III, 668.

Hydroxydiphenylpropylene - carboxylic Acid.

See Hydroxydiphenylvinylacetic Acid.

Hydroxy-sym.-diphenylurea.

See Hydroxycarbanilide.

3-Hydroxy-unsym.-diphenylurea (*Di-phenylcarbamhydroxamic acid*, *N-diphenylcarbamylhydroxylamine*)



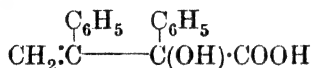
$C_{13}H_{12}O_2N_2$ MW, 228

M.p. 134–134.5°. Colourless sol. in H_2SO_4 , blue col. with addn. of HNO_3 .

Acetyl : m.p. 126.5–127°.

Hurd, *J. Am. Chem. Soc.*, 1923, **45**, 1485.

1-Hydroxy-1:2-diphenylvinylacetic Acid (*3-Hydroxy-2:3-diphenylpropylene-3-carboxylic acid*, *2-methylene-1:2-diphenyl-lactic acid*, *isocinnamandelic acid*)



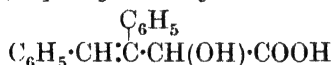
$C_{16}H_{14}O_3$ MW, 254

Needles from C_6H_6 . M.p. 161° decomp. Sol. hot C_6H_6 . Spar. sol. hot H_2O , cold C_6H_6 .

Acetyl : needles from C_6H_6 . M.p. 145–6°.

Japp, Lander, *J. Chem. Soc.*, 1897, **71**, 135.

1-Hydroxy-2:3-diphenylvinylacetic Acid (*3-Hydroxy-1:2-diphenylpropylene-3-carboxylic acid*, *2-phenyl-2-benzylidenelactic acid*)



$C_{16}H_{14}O_3$ MW, 254

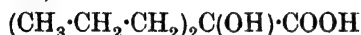
Needles from $CHCl_3$ -ligroin. M.p. 125°. Sol. EtOH, Et₂O, Me₂CO, $CHCl_3$, C_6H_6 . Boiling NaOH.Aq. → dibenzyl + oxalic acid.

Me ester : $C_{17}H_{16}O_3$. MW, 268. Needles from ligroin. M.p. 89°. Sol. EtOH, Et₂O, $CHCl_3$, CS_2 , C_6H_6 . Spar. sol. H_2O , cold ligroin.

Erlenmeyer, *Ann.*, 1904, **333**, 190.

Erlenmeyer, Lux, *Ber.*, 1898, **31**, 2228.

1-Hydroxydipropylacetic Acid (*Dipropylglycollic acid*)



$C_8H_{16}O_3$ MW, 160

Needles from H_2O . M.p. 80–1° (78°). Sol. EtOH, Et₂O. Spar. sol. cold H_2O . Sublimes. Volatile in steam.

Et ester : $C_{10}H_{20}O_3$. MW, 188. B.p. 208–10°.

Basse, Klinger, *Ber.*, 1898, **31**, 1218.

Crichton, *J. Chem. Soc.*, 1906, **89**, 932.

o-Hydroxydithiobenzoic Acid.

See Dithiosalicylic Acid.

1-Hydroxydocosene.

See Erucyl Alcohol.

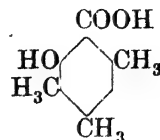
3-Hydroxydodecane.

See Ethylnonylcarbinol.

1-Hydroxydotriacontane.

See Lacceryl.

6-Hydroxydurylic Acid (*6-Hydroxy-2:4:5-trimethylbenzoic acid*, *3:4:6-trimethylsalicylic acid*)



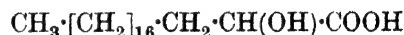
$C_{10}H_{12}O_3$

MW, 180

Needles from EtOH.Aq. M.p. 148°. Spar. sol. H_2O . Sublimes. Alc. $FeCl_3$ → blue col. HCl at 200° → 6-hydroxy-ψ-cumene.

Jacobsen, Schnapauff, *Ber.*, 1885, **18**, 2844.

1-Hydroxyeicosanic Acid (*1-Hydroxyarachidic acid*)



$C_{20}H_{40}O_3$

MW, 328

Leaflets from C_6H_6 -pet. ether. M.p. 91–2°. Sol. most org. solvents.

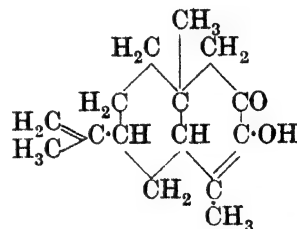
Me ester : $C_{21}H_{42}O_3$. MW, 342. Needles. M.p. 62–4°.

Et ester : $C_{22}H_{44}O_3$. MW, 356. Cryst. from EtOH. M.p. 62–3°.

Et ether : $C_{22}H_{44}O_3$. MW, 356. Needles from AcOH. M.p. 53–6°. Et ester : $C_{24}H_{48}O_3$. MW, 384. Needles from EtOH. M.p. 35–7°.

Baczewski, *Monatsh.*, 1896, **17**, 534.

2-Hydroxyeremophilone



$C_{15}H_{22}O_2$

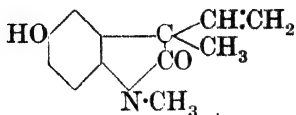
MW, 234

Constituent of oil of *Eremophila Mitchellii*. Prisms from MeOH. M.p. 66–7°. B.p. 189–90°/22 mm. D_{25}^{25} 1.0620. n_D^{25} 1.5564. $[\alpha]_{5461}^{25}$ +153° in MeOH. Resinifies rapidly in air. Reduces Fehling's and $NH_3 \cdot AgNO_3$. $FeCl_3$ → bluish-black col. Sol. $NaHSO_3$.Aq.

Benzoyl : prisms from MeOH. M.p. 119–20°. $[\alpha]_{5461}^{25}$ +162° in AcOEt.

Bradfield, Penfold, Simonsen, *J. Chem. Soc.*, 1932, 2754.

Hydroxyeserolene (*ψ-Geneserolene*, *oxeserolene*)



$C_{12}H_{13}O_2N$

MW, 203

Needles. M.p. 215° (224°). Spar. sol. H_2O .
Picrate : m.p. 215°.

Polonowski, Polonowski, *Compt. rend.*,
1925, **180**, 73; *Bull. soc. chim.*, 1918,
23, 347, 354.

Hydroxyethanesulphonic Acid.

See Isethionic Acid.

2-Hydroxy-5-ethoxybenzaldehyde.

See under Gentisic Aldehyde.

2-Hydroxy-5-ethoxybenzoic Acid.

See under Gentisic Acid.

3-Hydroxy-4-ethoxy-1-propenylbenzene.

See Isosafro Eugenol.

ω -Hydroxy-4-ethylacetophenone.

See 4-Ethylphenacyl Alcohol.

1-Hydroxyethylacetylene.

See 1-Methylpropargyl Alcohol.

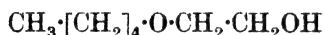
2-Hydroxyethyl allyl Ether.

See under Ethylene Glycol.

Hydroxyethylamine.

See Aminoethyl Alcohol.

2-Hydroxyethyl *n*-amyl Ether (*Ethylene glycol n-amyl ether*)



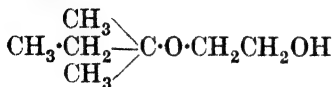
$C_7H_{16}O_2$

MW, 132

B.p. 181°/745 mm. D_4^{15} 0.8926.

Cretcher, Pittenger, *J. Am. Chem. Soc.*,
1924, **46**, 1503.

2-Hydroxyethyl *tert.*-amyl Ether (*Ethylene glycol tert.-amyl ether*)



$C_7H_{16}O_2$

MW, 132

B.p. 50-5°/3 mm. D_4^{20} 0.8993.

Baatsche Petroleum Maatschappij, F.P.,
739,266, (*Chem. Zentr.*, 1933, II, 607).

Hydroxy-ethylaniline.

See Ethylaminophenol.

β -Hydroxyethylaniline (2-Anilinoethyl alcohol)



$C_8H_{11}ON$

MW, 137

B.p. 286°, 167°/17 mm. Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. H_2O . KOH fusion \rightarrow indoxyl.

p-Tolyl ether : $C_{15}H_{17}ON$. MW, 227. Plates from EtOH. M.p. 55°.

2-Naphthyl ether : $C_{18}H_{17}ON$. MW, 263. Plates from EtOH. M.p. 75°.

O-Benzoyl : $C_{15}H_{15}O_2N$. MW, 241. Needles from EtOH. M.p. 77°.

Knorr, *Ber.*, 1889, **22**, 2092.

Auwers, Berge, *Ann.*, 1904, **332**, 209.

Schreiber, *Ber.*, 1891, **24**, 192.

Hydroxy-ethylbenzene.

See Ethylphenol.

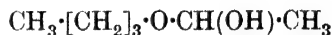
Hydroxyethylbenzene.

See Phenylethyl Alcohol and Methylphenylcarbinol.

Hydroxyethylbutylamine.

See *n*-Butylaminoethyl Alcohol.

1-Hydroxyethyl *n*-butyl Ether



$C_6H_{14}O_2$

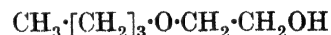
MW, 118

Acetyl : b.p. 166-72°, 54-54.5°/19 mm. D_4^{20} 0.9122. n_D^{20} 1.4709.

Henze, Murchison, *J. Am. Chem. Soc.*,
1933, **55**, 4255.

I.G., D.R.P., 566,033, (*Chem. Abstracts*,
1933, **27**, 996).

2-Hydroxyethyl *n*-butyl Ether (*Ethylene glycol butyl ether*)



$C_6H_{14}O_2$

MW, 118

B.p. 170.6°/743 mm. D_4^{15} 0.9011.

Benzoyl : b.p. 156.5-157°/14.5 mm., 131.6-132.6°/3 mm. D_{25}^{25} 1.0277. n_D^{25} 1.4925.

p-Nitrobenzoyl : b.p. 179-80°/3.5 mm. D_{25}^{25} 1.1518. n_D^{25} 1.5125.

Cretcher, Pittenger, *J. Am. Chem. Soc.*,
1924, **46**, 1503.

Conn, Collett, Lazzell, *J. Am. Chem. Soc.*,
1932, **54**, 4370.

2-Hydroxyethyl *tert.*-butyl Ether (*Ethylene glycol tert.-butyl ether*)



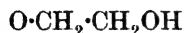
$C_6H_{14}O_2$

MW, 118

B.p. 150-3°. D_4^{20} 0.8970.

I.G., F.P., 39,773, (Addn. to F.P. 610,282)
(*Chem. Abstracts*, 1932, **26**, 4826).

Bataafsche Petroleum Maatschappij, F.P.,
739,266, (*Chem. Zentr.*, 1933, II, 607).

2-Hydroxyethyl *o*-chlorophenyl Ether
(Ethylene glycol *o*-chlorophenyl ether)C₈H₉O₂Cl MW, 172.5

Oil. B.p. 159–61°/22 mm.

p-Nitrobenzoyl: pale yellow plates from EtOH.
M.p. 81–2°.Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2136.**2-Hydroxyethyl *m*-chlorophenyl Ether**
(Ethylene glycol *m*-chlorophenyl ether).

Oil. B.p. 163–4°/22 mm.

p-Nitrobenzoyl: pale yellow cryst. from EtOH.
M.p. 104°.

See above reference.

2-Hydroxyethyl *p*-chlorophenyl Ether
(Ethylene glycol *p*-chlorophenyl ether).

Cryst. M.p. about 28°.

p-Nitrobenzoyl: pale yellow needles from EtOH. M.p. 90–1°.

See previous reference.

α-Hydroxyethylcyclobutane.

See Methylcyclobutylcarbinol.

α-Hydroxyethylcyclohexane.

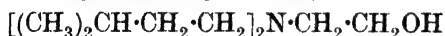
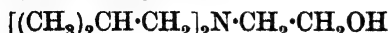
See Methylcyclohexylcarbinol.

α-Hydroxyethylcyclopropane.

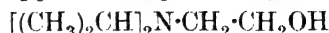
See Methylcyclopropylcarbinol.

Hydroxyethylene dibromide.

See 1 : 2-Dibromoethyl Alcohol.

N-[2-Hydroxyethyl]-di-isoamylamine
(2-Di-isoamylaminoethyl alcohol)C₁₂H₂₇ON MW, 201Oil. B.p. 247–8°/748 mm. D₄²⁰ 0.8492. n_D²⁰ 1.4435. Sol. EtOH, Et₂O, CHCl₃. Spar. sol. H₂O.Picrolonate: yellow plates from EtOH.Aq.
M.p. about 88°. Sol. EtOH.Matthes, *Ann.*, 1901, 316, 315.Einhorn, Fiedler, Ladisch, Uhlfelder, *Ann.*, 1909, 371, 148.**N-[2-Hydroxyethyl]-di-isobutylamine** (2-Di-isobutylaminoethyl alcohol)C₁₀H₂₃ON MW, 173Oil. B.p. 213–14°/754 mm. D₄²⁰ 0.8407. n_D²⁰ 1.4355. Sol. EtOH, Et₂O, CHCl₃, ligroin.B,HAuCl₄: yellow cryst. M.p. 86–8°. Spar. sol. H₂O, EtOH.Picrate: yellow prisms from EtOH.Aq. M.p. 123–5°. Spar. sol. H₂O, EtOH.

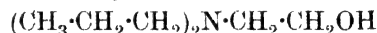
Picrolonate: yellow needles from EtOH.Aq. M.p. 134–5° decomp.

Matthes, *Ann.*, 1901, 316, 312.Einhorn, Fiedler, Uhlfelder, *Ann.*, 1909, 371, 146.**N-[2-Hydroxyethyl]-di-isopropylamine**
(2-Di-isopropylaminoethyl alcohol)C₈H₁₉ON MW, 145

Oil. B.p. 187–92°.

Einhorn, Fiedler, Uhlfelder, *Ann.*, 1909, 371, 145.**α-Hydroxy-α-ethyldiphenylmethane.**

See 1-Hydroxy-1 : 1-diphenylpropane.

N-[2-Hydroxyethyl]-dipropylamine (2-Dipropylaminoethyl alcohol)C₈H₁₉ON MW, 145Oil. B.p. 195–6°/748 mm. D₄²⁰ 0.8576. n_D²⁰ 1.4402. Sol. EtOH, Et₂O. Spar. sol. H₂O.

Picrate: yellow leaflets from EtOH. M.p. 80–2°.

Picrolonate: plates from EtOH.Aq. M.p. 128–30°.

Matthes, *Ann.*, 1901, 316, 312.**2-α-Hydroxyethylfuran.**

See Methyl-2-furylcarbinol.

Hydroxyethylguanidine.

See Guanidinoethyl Alcohol.

N-2-Hydroxyethylheptylamine (2-Heptylaminoethyl alcohol)C₉H₂₁ON MW, 159Cryst. M.p. 35°. B.p. 250–3°/751 mm. D₄²⁰ 0.8819. n_D²⁰ 1.4510. Sol. EtOH, Et₂O. Spar. sol. H₂O.Picrate: yellow needles from H₂O. M.p. 70–1°. Sol. EtOH. Spar. sol. H₂O.Picrolonate: brown leaflets from EtOH.Aq. M.p. 196°. Sol. EtOH. Spar. sol. H₂O.Matthes, *Ann.*, 1901, 315, 115.**3-Hydroxy-3-ethyl-*n*-hexane.**

See Diethylpropylcarbinol.

N-2-Hydroxyethylhexylamine (2-Hexylaminoethyl alcohol)C₈H₁₉ON MW, 145

B.p. 231°/747 mm. D_D^{20} 0.8829. n_D^{20} 1.4472.
Sol. EtOH, Et₂O. Spar. sol. H₂O.

Picrate: yellow prisms from EtOH.Aq. M.p. 80°. Sol. EtOH. Spar. sol. H₂O.

Picolonate: brown plates from EtOH.Aq. M.p. 208–10° decomp. Sol. EtOH. Spar. sol. H₂O.

Matthes, *Ann.*, 1901, 315, 114.

β -Hydroxy- β -ethylhydrocinnamic Acid.

See 2-Hydroxy-2-phenyl-*n*-valeric Acid.

2-Hydroxyethylidene bromide.

2: 2-Dibromoethyl Alcohol, *q.v.*

3- ω -Hydroxyethylindole.

See Tryptophol.

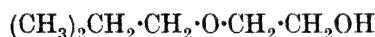
***N*-2-Hydroxyethylisoamylamine.**

See 2-Isoamylaminoethyl Alcohol.

***N*-2-Hydroxyethylisobutylamine.**

See 2-Isobutylaminoethyl Alcohol.

2-Hydroxyethyl isobutyl Ether (*Ethylene glycol isobutyl ether*)



C₆H₁₄O₂ MW, 118

B.p. 157–8°. D_D^{15} 0.8950.

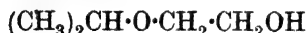
I.G., F.P., 39,773, (Addn. to F.P. 610,282)
(*Chem. Abstracts*, 1932, 26, 4826): E.P.,
271,169, (*Chem. Abstracts*, 1928, 22,
1596).

Cretcher, Pittenger, *J. Am. Chem. Soc.*,
1924, 46, 1503.

***N*-2-Hydroxyethylisopropylamine.**

See 2-Isopropylaminoethyl Alcohol.

2-Hydroxyethyl isopropyl Ether (*Ethylene glycol isopropyl ether*)



C₅H₁₂O₂ MW, 104

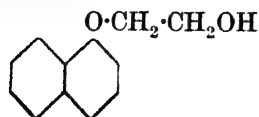
B.p. 144°/743 mm. D_D^{15} 0.9115.

Cretcher, Pittenger, *J. Am. Chem. Soc.*,
1924, 46, 1503.

α -Hydroxyethylnaphthalene.

See Methyl-naphthylcarbinol.

2-Hydroxyethyl 1-naphthyl Ether (*Ethylene glycol α -naphthyl ether*)

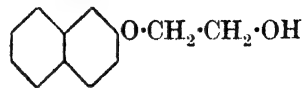


C₁₂H₁₂O₂ MW, 188

Plates from Et₂O–pet. ether. M.p. 42°.

Boyd, Marle, *J. Chem. Soc.*, 1914, 105,
2135.

2-Hydroxyethyl 2-naphthyl Ether (*Ethylene glycol β -naphthyl ether*)



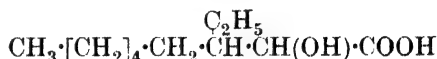
C₁₂H₁₂O₂ MW, 188

Cryst. from C₆H₆. M.p. 76°.

Rindfusz, Ginnings, Harnack, *J. Am. Chem. Soc.*, 1920, 42, 164.

See also above reference.

1-Hydroxy-2-ethylpelargonic Acid (*1-Hydroxy-2-ethylnonoic acid*)



C₁₁H₂₂O₃ MW, 202

Cryst. from pet. ether. M.p. 47°.

Et ester: C₁₃H₂₆O₃. MW, 230. B.p. 148–
50°/15 mm.

Bagard, *Bull. soc. chim.*, 1907, 1, 361.

***p*- β -Hydroxyethylphenol.**

See Tyrosol.

2- α -Hydroxyethyl-3-phenylbutyric Acid.

See 3-Hydroxy-2-benzyl-*n*-valeric Acid.

2-Hydroxyethyl phenyl Ether (*2-Phenoxyethyl alcohol, ethylene glycol phenyl ether*)



C₈H₁₀O₂ MW, 138

Oil. B.p. 237°, 165°/80 mm., 134–5°/18 mm.
 D_D^{20} 1.102. n_D^{20} 1.534. Sol. EtOH, Et₂O. Insol.
H₂O. Sol. KOH.Aq. Heat. with ZnCl₂ \longrightarrow
coumaran. Esters are used as perfumes and
flavourings.

Et ether: 1-ethoxy-2-phenoxyethane.
C₁₀H₁₄O₂. MW, 166. B.p. 230°. D_D^{11} 1.018.
Insol. H₂O.

Phenyl ether: see under Ethylene Glycol.

Acetyl: b.p. 241–3°.

Propionyl: b.p. 121°/4 mm.

Butyryl: b.p. 129–31°/4 mm.

Benzoyl: m.p. 64°.

Cinnamoyl: m.p. 64°.

p-Toluenesulphonyl: m.p. 80°.

Roithner, *Monatsh.*, 1894, 15, 674.

Bollmann, U.S.P., 1,841,430, (*Chem. Abstracts*, 1932, 26, 1617).

Bentley, Haworth, Perkin, *J. Chem. Soc.*,
1896, 69, 164.

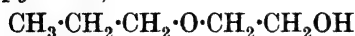
Smith, Niederl, *J. Am. Chem. Soc.*, 1931,
53, 808.

Hydroxyethyl phenyl Ketone.

See β - and γ -hydroxypropiophenone.

N-2-Hydroxyethylpropylamine.

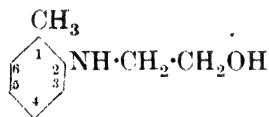
See 2-Propylaminoethyl Alcohol.

2-Hydroxyethyl propyl Ether (*Ethylene glycol propyl ether*) $\text{C}_5\text{H}_{12}\text{O}_2$ MW, 104B.p. 150°/743 mm. D_{15}^{20} 0.9141.I.G., E.P., 271,169, (*Chem. Abstracts*, 1928, 22, 1596).Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, 46, 1503.**Hydroxyethylsuccinic Acid.**

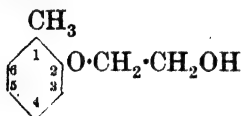
See Ethylmalic Acid.

5-Hydroxy-2-ethyltetrahydrofuran.See 3-Hydroxy-*n*-caproic Aldehyde. **α -Hydroxyethyltoluene.**

See Methyltolylcarbinol.

N- β -Hydroxyethyl- α -toluidine (2-*o*-Toluidinoethanol, 2-*o*-toluidinoethyl alcohol) $\text{C}_9\text{H}_{13}\text{ON}$ MW, 151Straw-coloured oil. B.p. 172°/12 mm., 145–50°/3 mm. D_{20}^{20} 1.0962. n_D^{20} 1.5675.Dains, Brewster, Blair, Thompson, *J. Am. Chem. Soc.*, 1922, 44, 2639.Adams, Segur, *J. Am. Chem. Soc.*, 1923, 45, 788.**N- β -Hydroxyethyl-*p*-toluidine** (2-*p*-Toluidinoethanol, 2-*p*-toluidinoethyl alcohol).Plates from Et_2O -ligroin. M.p. 42–3°. B.p. 153–5°/4 mm.

See second reference above.

2-Hydroxyethyl α -tolyl Ether (*Ethylene glycol α -tolyl ether*) $\text{C}_9\text{H}_{12}\text{O}_2$ MW, 152Oil. B.p. 141°/19 mm. D_{20}^{20} 1.079. n_D^{20} 1.528.*Isobutyryl*: b.p. 128–30°/4 mm.*p*-Nitrobenzoyl: plates from EtOH. M.p. 78.5–79.5°.Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2133.Bollmann, U.S.P., 1,841,430, (*Chem. Abstracts*, 1932, 26, 1617).Rindfus, Ginnings, Harnack, *J. Am. Chem. Soc.*, 1920, 42, 161.**2-Hydroxyethyl *m*-tolyl Ether** (*Ethylene glycol *m*-tolyl ether*).

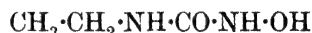
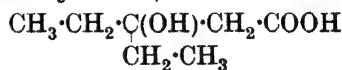
Oil. B.p. 145–7°/19 mm.

p-Nitrobenzoyl: plates from EtOH. M.p. 80.5–81.5°.

See first reference above.

2-Hydroxyethyl *p*-tolyl Ether (*Ethylene glycol *p*-tolyl ether*).

Prisms from pet. ether. M.p. 44–5°.

Isobutyryl: b.p. 124–5°/3 mm.Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2134.Bollmann, U.S.P., 1,841,430, (*Chem. Abstracts*, 1932, 26, 1617).**N-2-Hydroxyethylurea** (*Ureidoethyl alcohol, carbamylethanolamine*) $\text{C}_3\text{H}_8\text{O}_2\text{N}_2$ MW, 104Cryst. from EtOH. M.p. 95°. Sol. H_2O . EtOH, MeOH.*Diacetyl deriv.*: m.p. 102°.*Benzoyl deriv.*: m.p. 129°.*Et ether*: $\text{C}_5\text{H}_{12}\text{O}_2\text{N}_2$. MW, 132. Cryst. M.p. 56°. Sol. H_2O , EtOH. Insol. Et_2O .Franchimont, *Rec. trav. chim.*, 1894, 13, 488.Knorr, Meyer, *Ber.*, 1905, 38, 3131.Gabriel, *Ber.*, 1917, 50, 826.**N'-Hydroxy-*N*-ethylurea** (*Ethylglycylhydrazylamine*) $\text{C}_3\text{H}_8\text{O}_2\text{N}_2$ MW, 104M.p. 129° decomp. Sol. H_2O . Mod. sol. EtOH.Francesconi, Parrozzani, *Gazz. chim. ital.*, 1901, 31, 344.**2-Hydroxy-2-ethylvaleric Acid** (2:2-Diethylhydracrylic acid) $\text{C}_7\text{H}_{14}\text{O}_3$ MW, 146Needles. M.p. 38–9°. Sol. H_2O , EtOH, Et_2O . $k = 3.03 \times 10^{-5}$ at 25°. Dist. with dil. H_2SO_4 → 2:2-diethylacrylic acid.*Et ester*: $\text{C}_9\text{H}_{18}\text{O}_3$. MW, 174. B.p. 77°/14 mm. D_{20}^{20} 0.90432. n_D^{20} 1.4440.Schirokow, *J. prakt. Chem.*, 1881, 23, 201. Fichter, Kiefer, Bernouilli, *Ber.*, 1909, 42, 4712.Kon, Nargund, *J. Chem. Soc.*, 1932, 2462.

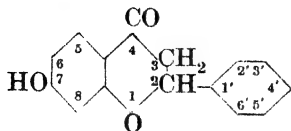
ω -Hydroxyeugenol.

See Lubanol.

4-Hydroxyflavan.

See Flavanol.

7-Hydroxyflavanone

 $C_{15}H_{12}O_3$

MW, 240

Needles from toluene. M.p. 189° . Sol. EtOH, AcOH. Insol. H_2O . Yellow sol. in NaOH.Aq.
Me ether: $C_{16}H_{14}O_3$. MW, 254. M.p. 89° .
Acetyl: m.p. 98° .

Ellison, *J. Chem. Soc.*, 1927, 1722.Shinoda, *Chem. Abstracts*, 1928, **22**, 2947.

4'-Hydroxyflavanone.

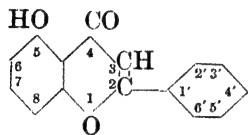
Me ether: m.p. $92-4^\circ$. $PCl_5 \rightarrow$ 4'-methoxyflavone.

Hattori, *Chem. Abstracts*, 1926, **20**, 2162.

3-Hydroxyflavone.

See Flavonol.

5-Hydroxyflavone (5-Hydroxy-2-phenyl-chromone)

 $C_{15}H_{10}O_3$

MW, 238

M.p. $156-7^\circ$.*Acetyl*: m.p. 145° .*Me ether*: $C_{16}H_{12}O_3$. MW, 252. M.p. 135° .Simonis, Danshevski, *Ber.*, 1926, **59**, 2914.Sugasawa, *Chem. Abstracts*, 1934, **28**, 6717.

6-Hydroxyflavone (6-Hydroxy-2-phenyl-chromone).

Yellow needles from EtOH.Aq. M.p. $231-2^\circ$.
 $NaOH \rightarrow$ greenish-yellow col.

Et ether: $C_{17}H_{14}O_3$. MW, 266. Needles from EtOH.Aq. or ligroin. Prisms from C_6H_6 . M.p. $146-7^\circ$.

Acetyl: m.p. $157-8^\circ$.Kostanecki, Levi, Tambor, *Ber.*, 1899, **32**, 331.

7-Hydroxyflavone (7-Hydroxy-2-phenyl-chromone).

Needles from dil. EtOH. M.p. 240° . $NaOH \rightarrow$ yellow col.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Needles from EtOH. M.p. $110-11^\circ$.

Et ether: needles. M.p. $138-9^\circ$. $H_2SO_4 \rightarrow$ blue fluor.

Acetyl: m.p. $129-30^\circ$.Emilewicz, Kostanecki, *Ber.*, 1899, **32**, 312.

2'-Hydroxyflavone (2-o-Hydroxyphenyl-chromone).

Plates from EtOH. M.p. $249-50^\circ$. Conc. $H_2SO_4 \rightarrow$ greenish-yellow col. $NaOEt \rightarrow$ salicylic acid + o-hydroxyacetophenone.

Me ether: prisms from CS_2 . M.p. 103° .*Acetyl*: m.p. $88.5-89^\circ$.Bogert, Marcus, *J. Am. Chem. Soc.*, 1919, **41**, 95.

3'-Hydroxyflavone (2-m-Hydroxyphenyl-chromone).

Prisms from dil. EtOH. M.p. 208° .

Et ether: $C_{17}H_{14}O_3$. MW, 266. Needles from dil. EtOH. M.p. 118° .

Acetyl: m.p. 97° .Kostanecki, Tambor, *Ber.*, 1901, **34**, 1692.

4'-Hydroxyflavone (2-p-Hydroxyphenyl-chromone).

Needles from EtOH-Py. M.p. $269-70^\circ$. Sol. dil. NaOH. Spar. sol. hot EtOH.

Me ether: $C_{16}H_{12}O_3$. MW, 252. M.p. 158.5° .

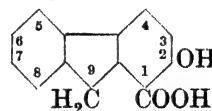
Et ether: $C_{17}H_{14}O_3$. MW, 266. Needles from EtOH. M.p. $139-40^\circ$.

Acetyl: m.p. 136° .Grossmann, Kostanecki, *Ber.*, 1900, **33**, 2516.Hattori, *Chem. Abstracts*, 1926, **20**, 2162.

Hydroxyfluorene.

See Fluorenol.

2-Hydroxyfluorene-1-carboxylic Acid (2-Fluorenol-1-carboxylic acid)

 $C_{14}H_{10}O_3$

MW, 226

Yellow cryst. from EtOH. M.p. $236-40^\circ$.Easily sol. EtOH. $FeCl_3 \rightarrow$ blue col.o-Toluidide: m.p. $178-80^\circ$.Ballauf, Schmelzer, D.R.P., 530,293, (*Chem. Zentr.*, 1930, II, 3852).

2-Hydroxyfluorene-3-carboxylic Acid (2-Fluorenol-3-carboxylic acid).

Grey cryst. from EtOH. M.p. $256-60^\circ$. Spar. sol. EtOH. $FeCl_3 \rightarrow$ blue col.

o-Toluidide: m.p. 221° .

See above reference.

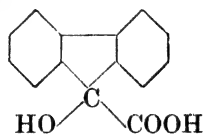
9-Hydroxyfluorene-4-carboxylic Acid (9-Fluorenol-4-carboxylic acid).

Cryst. from H_2O . M.p. 203° . Sol. hot H_2O , EtOH, Et_2O , CHCl_3 , C_6H_6 . Insol. cold H_2O . Sol. conc. H_2SO_4 to green sol. $\text{KMnO}_4 \rightarrow$ fluorenone-4-carboxylic acid. $\text{P} + \text{HI} \rightarrow$ fluorene.

Amide: $\text{C}_{14}\text{H}_{11}\text{O}_2\text{N}$. MW, 225. Leaflets from H_2O . M.p. $206-10^\circ$. Sublimes.

Graebe, Aubin, *Ann.*, 1888, **247**, 284.

Wegerhoff, *Ann.*, 1889, **252**, 29.

9-Hydroxyfluorene-9-carboxylic Acid (α -Hydroxydiphenyleneacetic acid, diphenyleneglycollic acid, 9-fluorenol-9-carboxylic acid)

$\text{C}_{14}\text{H}_{10}\text{O}_3$ MW, 226

Leaflets + $\frac{1}{2}\text{H}_2\text{O}$ from H_2O , m.p. 125° ; anhyd. 169° . Spar. sol. cold H_2O , C_6H_6 . $k = 1.0 \times 10^{-3}$ at 25° . Ox. \rightarrow fluorenone. $\text{P} + \text{HI} \rightarrow$ fluorenone-9-carboxylic acid.

Me ester: $\text{C}_{15}\text{H}_{12}\text{O}_3$. MW, 240. Cryst. from Me_2CO . Aq. M.p. 160° . Acetyl: leaflets from EtOH. M.p. $147-8^\circ$.

Et ester: $\text{C}_{16}\text{H}_{14}\text{O}_3$. MW, 254. Prisms from EtOH. Aq. M.p. 96° (92°). Acetyl: prisms from EtOH. M.p. $103-4^\circ$.

Me ether: $\text{C}_{15}\text{H}_{12}\text{O}_3$. MW, 240. Needles from EtOH. M.p. 181° decomp. Me ester: $\text{C}_{16}\text{H}_{14}\text{O}_3$. MW, 254. M.p. 124° . Et ester: $\text{C}_{17}\text{H}_{16}\text{O}_3$. MW, 268. Needles. M.p. 72° .

Et ether: $\text{C}_{16}\text{H}_{14}\text{O}_3$. MW, 254. Cryst. M.p. 169° . Me ester: $\text{C}_{17}\text{H}_{16}\text{O}_3$. MW, 268. Needles from EtOH. Aq. M.p. $77-8^\circ$.

Staudinger, *Ber.*, 1906, **39**, 3062.

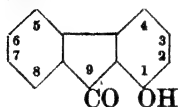
Klinger, *Ann.*, 1912, **390**, 373.

Schmidt, Mezger, *Ber.*, 1906, **39**, 3897.

Baeyer, Friedländer, *Ber.*, 1877, **10**, 126.

Schlenk *et al.*, *Ann.*, 1928, **463**, 98.

Kliegel, *Ber.*, 1931, **64**, 2420.

1-Hydroxyfluorenone (1-Hydroxy-9-keto-fluorene, 9-keto-1-fluorenol)

$\text{C}_{13}\text{H}_8\text{O}_2$ MW, 196

Yellow needles. M.p. 115° . Sol. C_6H_6 , AcOH. Volatile in steam. KOH fusion \rightarrow 3-hydroxydiphenyl-2-carboxylic acid. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ wine-red col.

Me ether: $\text{C}_{14}\text{H}_{10}\text{O}_2$. MW, 210. Yellow needles from EtOH. M.p. $141.5-142.5^\circ$.

Et ether: $\text{C}_{15}\text{H}_{12}\text{O}_2$. MW, 224. Yellow plates from EtOH. M.p. $99-100^\circ$.

Benzyl ether: $\text{C}_{20}\text{H}_{14}\text{O}_2$. MW, 286. Yellow needles from ligroin. M.p. $93-4^\circ$.

Acetyl: plates or needles from EtOH. Aq. M.p. $130-1^\circ$.

Benzoyl: m.p. $128-9^\circ$.

Oxime: yellow needles from C_6H_6 . M.p. $169-70^\circ$.

Phenylhydrazone: m.p. $173-4^\circ$.

Staedel, *Ber.*, 1895, **28**, 113.

Heyl, *J. prakt. Chem.*, 1899, **59**, 447.

2-Hydroxyfluorenone (2-Hydroxy-9-keto-fluorene, 9-keto-2-fluorenol).

Red needles from AcOH. Aq. M.p. $210-11^\circ$. Spar. sol. hot H_2O , EtOH, Et_2O . Sublimes.

Me ether: yellow needles from EtOH. M.p. $77-8^\circ$.

Hydrazone: yellow needles. M.p. $201-2^\circ$.

Ketazine: brown powder. M.p. $301-3^\circ$.

Diels, *Ber.*, 1901, **34**, 1767.

Werner, Reknier, Schwabacher, *Ann.*, 1902, **322**, 168.

Gerhardt, *Monatsh.*, 1920, **41**, 199.

Patrizietti, *Chem. Zentr.*, 1934, II, 3617.

3-Hydroxyfluorenone (3-Hydroxy-9-keto-fluorene, 9-keto-3-fluorenol).

Yellow needles from EtOH. M.p. $228-9^\circ$ (225°). Sol. EtOH, AcOH, xylene. Spar. sol. C_6H_6 . Insol. H_2O . Violet sol. in conc. H_2SO_4 .

Me ether: yellow plates from C_6H_6 -pet. ether. M.p. 99° ($96-7^\circ$). Sol. EtOH, C_6H_6 , AcOH. Violet-red sol. in conc. H_2SO_4 .

Acetyl: yellow needles from EtOH. Aq. M.p. 115° .

Oxime: brown cryst. from C_6H_6 . M.p. $187-8^\circ$ decomp. Sol. EtOH, AcOH. Mod. sol. C_6H_6 . Spar. sol. hot H_2O .

Ullmann, Bleier, *Ber.*, 1902, **35**, 4278.

Errara, La Spada, *Gazz. chim. ital.*, 1905, **35**, 546.

Bardout, *Chem. Abstracts*, 1932, **26**, 1275.

4-Hydroxyfluorenone (4-Hydroxy-9-keto-fluorene, 9-keto-4-fluorenol).

Orange-red cryst. from EtOH. M.p. 249° . Sol. EtOH, Et_2O . Spar. sol. hot H_2O . KOH fusion \rightarrow 6-hydroxydiphenyl-2-carboxylic acid + 2'-hydroxydiphenyl-2-carboxylic acid.

Graebe, Schestakow, *Ann.*, 1895, **284**, 315.

Hydroxyformylacetic Acid.

See Hydroxypyruvic Acid.

Hydroxyfumaric Acid.

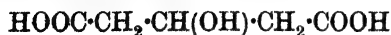
See Oxalacetic Acid.

2-Hydroxyglutamic Acid (2-Hydroxy-1-aminopropane-1 : 3-dicarboxylic acid, 2-hydroxy-1-aminoglutaric acid) $\text{C}_5\text{H}_9\text{O}_5\text{N}$

MW, 163

d-.
Prisms from H_2O . Sinters at 100° . Sol. H_2O , AcOH. Spar. sol. MeOH. Insol. EtOH, Et_2O . HI at $150^\circ \rightarrow d$ -glutamic acid.*Brucine salt*: m.p. 200° decomp. $[\alpha]_D^{20} - 25.0^\circ$.
Strychnine salt: m.p. about 245° .*dl*-.
M.p. anhyd. 195° decomp. Sol. H_2O . Insol. EtOH.*B, HCl*: m.p. 187° decomp.*Et ester*: $\text{C}_7\text{H}_{13}\text{O}_5\text{N}$. MW, 191. *Hydrochloride*: m.p. 168.5° .Dakin, *Biochem. J.*, 1918, 12, 306; *Chem. Zentr.*, 1920, I, 681.Harrington, Randall, *Biochem. J.*, 1931, 25, 1923.**1-Hydroxyglutaric Acid** (1-Hydroxy-propane-1 : 3-dicarboxylic acid) $\text{C}_5\text{H}_8\text{O}_5$

MW, 148

d-.
Cryst. from Et_2O . M.p. 72° . $[\alpha]_D^{19} + 1.76^\circ$ in H_2O . HI at $120^\circ \rightarrow$ glutaric acid.*Di-Na salt*: $[\alpha]_D^{23} + 8.58^\circ$ in H_2O .*l*-.
Cryst. M.p. $72-3^\circ$. $[\alpha]_D - 1.98^\circ$ in H_2O .*Di-Na salt*: $[\alpha]_D^{19} - 8.65^\circ$ in H_2O .*dl*-.
Cryst. M.p. 72° . Evaporation of aq. sol. \rightarrow butyrolactone- γ -carboxylic acid.*v. Lippmann, Ber.*, 1882, 15, 1156.
Karrer, Kaase, *Helv. Chim. Acta*, 1919, 2, 446.**2-Hydroxyglutaric Acid** (2-Hydroxy-propane-1 : 3-dicarboxylic acid) $\text{C}_5\text{H}_8\text{O}_5$

MW, 148

Needles from H_2O . M.p. 95° . Sol. H_2O , EtOH. Spar. sol. Et_2O . Vacuum dist. \rightarrow vinylacetic acid + glutaconic acid + glutaconic anhydride. HI at $180^\circ \rightarrow$ glutaric acid.NaOH or 60% $\text{H}_2\text{SO}_4 \rightarrow$ glutaconic acid.
 CH_3COCl in the cold \rightarrow 2-acetoxyglutaric anhydride.*Di-Et ester*: $\text{C}_9\text{H}_{16}\text{O}_6$. MW, 204. B.p. $156-7^\circ/23$ mm., $150-1^\circ/11$ mm. *Acetyl*: b.p. $153-4^\circ/11$ mm.*Monoamide*: $\text{C}_5\text{H}_9\text{O}_4\text{N}$. MW, 147. Cryst. from EtOH- Et_2O . M.p. 108° . Sol. H_2O , MeOH, EtOH.*Acetyl*: m.p. $65-6^\circ$. $k = 1.57 \times 10^{-4}$.Dakin, *Biochem. J.*, 1919, 13, 415.Lutz, *Chem. Zentr.*, 1910, I, 908.*v. Pechmann, Jenisch, Ber.*, 1891, 24, 3250.**Hydroxygranatanine.**

See Granatoline.

Hydroxyhemimellitene.

See Hemimellitenol.

14-Hydroxyheptacosane.

See Heptacosanol-14.

4-Hydroxy-1 : 5-heptadiene.

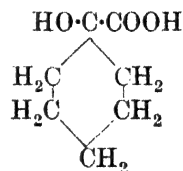
See Propenylallylcarbinol.

Hydroxyheptane.See *n*-Heptyl Alcohol, Methyl-*n*-amylcarbinol, Ethyl-*n*-butylcarbinol, and Dipropylcarbinol.**4-Hydroxyheptadi-ine-2 : 5.**

See 2 : 5-Heptadi-inol-4.

Hydroxyheptane-dicarboxylic Acid.

See Hydroxyazelaic Acid.

1-Hydroxyhexahydrobenzoic Acid (Cyclohexanol-1-carboxylic acid) $\text{C}_7\text{H}_{12}\text{O}_3$

MW, 144

Prisms from H_2O or EtOH. M.p. $108-9^\circ$ (107°). Sol. EtOH, Et_2O , C_6H_6 . Mod. sol. H_2O . P + HI at $200^\circ \rightarrow$ hexahydrobenzoic acid.*Me ester*: $\text{C}_8\text{H}_{14}\text{O}_3$. MW, 158. B.p. $103^\circ/17$ mm., $96^\circ/16$ mm.*Et ester*: $\text{C}_9\text{H}_{16}\text{O}_3$. MW, 172. Prisms or needles. M.p. $20-2^\circ$. B.p. $99-100^\circ/15$ mm., $111^\circ/18$ mm. $D_4^{17} 1.0471$. $n_D^{17} 1.457$.*Amide*: $\text{C}_7\text{H}_{13}\text{O}_3\text{N}$. MW, 143. Needles from AcOEt. M.p. $128-9^\circ$ (124°). Sol. EtOH, Me₂CO, AcOH, hot AcOEt. Mod. sol. C_6H_6 . Spar. sol. pet. ether. *Benzoate*: m.p. 118° .*Nitrile*: cyclohexanone cyanhydrin. $\text{C}_7\text{H}_{11}\text{ON}$. MW, 125. M.p. 29° . B.p. $125-6^\circ/$

17.5 mm. Sol. H_2O . Insol. usual org. solvents.
Benzoate: cryst. m.p. 71° .

Ultée, *Rec. trav. chim.*, 1909, **28**, 4, 19.

Tarbouriech, *Compt. rend.*, 1909, **149**, 604.

Aloy, Rabaut, *Compt. rend.*, 1913, **156**, 1548.

Meerwein, *Ann.*, 1913, **396**, 239.

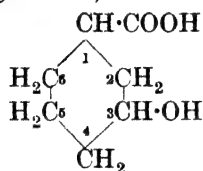
Auwers, Krollpfeiffer, *Ber.*, 1915, **48**, 1392.

Boeseken, Lutgerhost, *Rec. trav. chim.*, 1932, **51**, 164.

2-Hydroxyhexahydrobenzoic Acid.

See Hexahydrosalicylic Acid.

3-Hydroxyhexahydrobenzoic Acid (Cyclohexanol-3-carboxylic acid)



$\text{C}_7\text{H}_{12}\text{O}_3$

MW, 144

Cis:

Plates from AcOEt . M.p. 132° . Sol. EtOH , Et_2O , H_2O .

Me ester: $\text{C}_8\text{H}_{14}\text{O}_3$. MW, 158. B.p. $140-50^\circ/14$ mm.

Et ester: $\text{C}_9\text{H}_{16}\text{O}_3$. MW, 172. B.p. $148-58^\circ/14$ mm.

Amide: $\text{C}_7\text{H}_{13}\text{O}_2\text{N}$. MW, 143. Plates from H_2O . M.p. 161° .

Trans:

Cryst. from Et_2O . M.p. $119-20^\circ$. Sol. H_2O , EtOH . Spar. sol. Et_2O .

Einhorn, Coblitz, D.R.P., 81,443; *Ann.*, 1896, **291**, 298.

Perkin, Tattersall, *J. Chem. Soc.*, 1907, **91**, 482.

Schwenk, Jordan, U.S.P., 1,877,991, (*Chem. Abstracts*, 1933, **27**, 311).

Balas, Srol, *Chem. Zentr.*, 1930, II, 1072.

4-Hydroxyhexahydrobenzoic Acid (Cyclohexanol-4-carboxylic acid).

Cis:

Needles or prisms from pet. ether. M.p. 152° . Sol. Et_2O , C_6H_6 , pet. ether. Slightly sol. Me_2CO , H_2O .

Lactone: cryst. from Et_2O . M.p. $109-10^\circ$.

Trans:

Needles from Me_2CO . M.p. $120-1^\circ$.

Perkin, *J. Chem. Soc.*, 1904, **85**, 430.

See also last reference above.

6-Hydroxyhexahydrophenyl- α -alanine.

See Hexahydrotyrosine.

4-Hydroxyhexahydrophenylethylamine.

See Hexahydrotyramine.

Hydroxyhexahydrotoluic Acid.

See Methylcyclohexanol-carboxylic Acid.

Hydroxyhexane.

See *n*-Hexyl Alcohol, Methyl-*n*-butylcarbinol, and Ethylpropylcarbinol.

Hydroxyhexene.

See Hexenol.

2-Hydroxyhippuric Acid (*Salicyloylaminoacetic acid*, *o*-hydroxybenzoylglycine, *salicyloylglycine*)



$\text{C}_9\text{H}_9\text{O}_4\text{N}$

MW, 195

Needles from H_2O or $\text{EtOH}-\text{C}_6\text{H}_6$. M.p. $170-2^\circ$ (164°). Sol. EtOH , MeOH , Me_2CO , AcOEt . Spar. sol. H_2O , Et_2O , C_6H_6 , CHCl_3 , pet. ether. Strong acid. $\text{FeCl}_3 \rightarrow$ violet col. *Et ester*: $\text{C}_{11}\text{H}_{13}\text{O}_4\text{N}$. MW, 223. Needles from H_2O or Et_2O . M.p. 88° .

Bondi, *Z. physiol. Chem.*, 1907, **52**, 172.

Fischer, *Ber.*, 1909, **42**, 221.

Schroeter, *Ber.*, 1919, **52**, 2226.

3-Hydroxyhippuric Acid (*3-Hydroxybenzoylaminoacetic acid*, *m*-hydroxybenzoylglycine).

Needles from H_2O . Sol. EtOH , Et_2O . Spar. sol. cold H_2O . Conc. $\text{HCl} \rightarrow$ glycine + *m*-hydroxybenzoic acid.

Baumann, Herter, *Z. physiol. Chem.*, 1877, **1**, 260.

Conrad, *J. prakt. Chem.*, 1877, **15**, 259.

4-Hydroxyhippuric Acid (*4-Hydroxybenzoylaminoacetic acid*, *p*-hydroxybenzoylglycine).

Prisms from H_2O . M.p. 240° decomp. Sol. hot EtOH . Spar. sol. hot Me_2CO , AcOEt . Insol. Et_2O , C_6H_6 , CHCl_3 , pet. ether. Millon's reagent \rightarrow red col.

Me ether: see Anisoylglycine.

Baumann, Herter, *Z. physiol. Chem.*, 1877, **1**, 260.

Fischer, *Ber.*, 1908, **41**, 2880.

Matsuo, *J. Biol. Chem.*, 1918, **35**, 295.

1-Hydroxyhomopiperidinic Acid.

See 1-Hydroxy-4-aminovaleric Acid.

α -Hydroxyhomopiperonylic Acid.

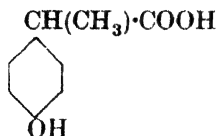
See 3:4-Methylenedioxy mandelic Acid.

α -Hydroxyhydratropic Acid.

Atrolactic Acid, *q.v.*

β -Hydroxyhydratropic Acid.

See Tropic Acid.

4-Hydroxyhydratropic Acid (1-*p*-Hydroxy-phenylpropionic acid) $C_9H_{10}O_3$

MW, 166

l.

Me ether: 1-*p*-methoxyphenylpropionic acid. $C_{10}H_{12}O_3$. MW, 180. M.p. 57°. $[\alpha]_D^{25} - 67^\circ 40'$ in 96% EtOH.

dl.

Needles from H_2O , prisms from Et_2O . M.p. 130°. Sol. hot H_2O , EtOH, Et_2O . Spar. sol. cold H_2O . Insol. CS_2 .

Me ether: $C_{10}H_{12}O_3$. MW, 180. Prisms from Et_2O -pet. ether. M.p. 57°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. cold pet. ether, cold H_2O .

Et ether: $C_{11}H_{14}O_3$. MW, 194. Cryst. from H_2O . M.p. 68°. Sol. hot H_2O , Et_2O , EtOH.

Bougault, *Ann. chim.*, 1902, **25**, 519, 530.

3-Hydroxyhydrazobenzene (3-Hydroxy-sym.-diphenylhydrazine, sym.-phenyl-*m*-hydroxy-phenylhydrazine) $C_{12}H_{12}ON_2$

MW, 200

Needles from C_6H_6 -ligroin. M.p. 126–126.5°. Sol. hot H_2O , EtOH, Et_2O . Spar. sol. ligroin. Min. acids \rightarrow 2-hydroxybenzidine.

Et ether: $C_{14}H_{16}ON_2$. MW, 228. Needles. M.p. 74–5°.

Jacobson, Hönigsberger, *Ber.*, 1903, **36**, 4112.

4-Hydroxyhydrazobenzene (4-Hydroxy-sym.-diphenylhydrazine, sym.-phenyl-*p*-hydroxy-phenylhydrazine).

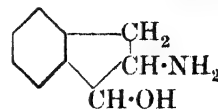
Et ether: m.p. 86°.

Acetyl: needles from C_6H_6 -ligroin. M.p. 114–15°. Sol. EtOH, C_6H_6 . Spar. sol. ligroin. Insol. alkalis.

Benzoyl: prisms. M.p. 173°. Sol. EtOH, Et_2O , C_6H_6 .

Goldschmidt, Brubacher, *Ber.*, 1891, **24**, 2309.

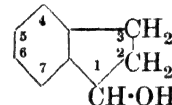
Jacobson, Hugershoff, *Ber.*, 1903, **36**, 3848.

1-Hydroxy-2-hydrindamine (2-Amino-indanol-1, 1-hydroxy-2-aminohydrindene) $C_9H_{11}ON$

MW, 149

Plates from Et_2O . M.p. 132–3°. Sol. H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 . $HNO_2 \rightarrow$ hydrindene glycol.

Spilker, *Ber.*, 1893, **26**, 1542.

1-Hydroxyhydrindene (1-Indanol, 1-hydroxyindane) $C_9H_{10}O$

MW, 134

Plates from pet. ether. M.p. 54. B.p. 128°/12 mm. Very sol. EtOH, $CHCl_3$, C_6H_6 . Spar. sol. pet. ether, H_2O .

Acetyl: oil. B.p. 241°, 135°/15 mm.

Me ether: $C_{10}H_{12}O$. MW, 148. Oil. B.p. about 98°/10 mm.

Et ether: $C_{11}H_{14}O$. MW, 162. Oil. B.p. 106–9°/16 mm.

Weissgerber, *Ber.*, 1911, **44**, 1445.

4-Hydroxyhydrindene (4-Indanol, 4-hydroxyindane).

Cryst. from pet. ether. M.p. 47–51°. B.p. 120°/12 mm.

Me ether: oil. B.p. 225–7°.

Goth, *Ber.*, 1928, **61**, 1459.

Moschner, *Ber.*, 1901, **34**, 1258.

5-Hydroxyhydrindene (5-Indanol, 5-hydroxyindane).

Needles from pet. ether. M.p. 55°. B.p. 255°. Very sol. EtOH, Et_2O . Spar. sol. hot H_2O , pet. ether.

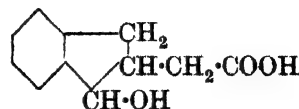
Me ether: oil. B.p. 233–4°.

Et ether: oil. B.p. 246°.

Benzoyl: plates from EtOH. M.p. 106–7°.

Borsche, John, *Ber.*, 1924, **57**, 659.

Moschner, *Ber.*, 1900, **33**, 739.

1-Hydroxyhydrindenyl-2-acetic Acid (1-Indanol-2-acetic acid, 1-hydroxy-2-carboxymethylhydrindene) $C_{11}H_{12}O_3$

MW, 192

α -1-Hydroxyhydrindenyl-2-*n*-hexoic Acid

Cis:

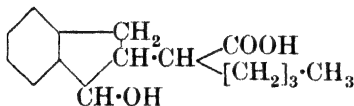
Lactone: $C_{11}H_{10}O_2$. MW, 174. Cryst. from pet. ether. M.p. 73° . Sol. EtOH, MeOH, C_6H_6 , Et_2O , NH_3 , NaOH. Insol. $NaHCO_3$.

Trans:

Cryst. from hot H_2O , dil. EtOH, or C_6H_6 - Me_2CO . M.p. 131° . Sol. EtOH, Et_2O . Spar. sol. cold H_2O , C_6H_6 .

Peacock, Menon, *J. Chem. Soc.*, 1934, 1299.

α -1-Hydroxyhydrindenyl-2-*n*-hexoic Acid



$C_{15}H_{20}O_3$

MW, 248

Cis:

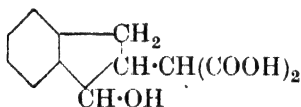
Lactone: $C_{15}H_{18}O_2$. MW, 230. Cryst. from pet. ether or EtOH. M.p. 105° .

Trans:

Cryst. from C_6H_6 . M.p. 122° .

Peacock, Menon, *J. Chem. Soc.*, 1934, 1302.

1-Hydroxyhydrindenyl-2-malonic Acid (1-Indanol-2-malonic acid)



$C_{12}H_{12}O_5$

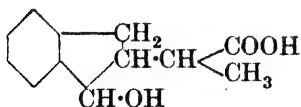
MW, 236

Trans:

Cryst. from H_2O or EtOH- C_6H_6 . M.p. 118° . Spar. sol. Et_2O , C_6H_6 . Heat at 120 - $30^\circ \rightarrow$ *trans*-1-hydroxyhydrindenyl-2-acetic acid.

Peacock, Menon, *J. Chem. Soc.*, 1934, 1299.

α -1-Hydroxyhydrindenyl-2-propionic Acid (1-Indanol-2- α -propionic acid)



$C_{12}H_{14}O_3$

MW, 206

Cis:

Lactone: $C_{12}H_{12}O_2$. MW, 188. Cryst. from pet. ether. M.p. 102° .

Trans:

Cryst. from C_6H_6 - Me_2CO . M.p. 131° .

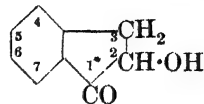
Peacock, Menon, *J. Chem. Soc.*, 1934, 1302.

Dict. of Org. Comp.—II.

273

α -Hydroxyhydrocinnamic Acid

2-Hydroxyhydrindone (2-Hydroxyindanone)



$C_9H_8O_2$

MW, 148

M.p. 40° . B.p. 128 - $33^\circ/1$ mm. Reduces cold Fehling's.

Acetyl: b.p. $137^\circ/1$ mm.

Phenylurethane: cryst. M.p. 133 - 4° .

Ishiwara, *J. prakt. Chem.*, 1924, 108, 194.

5-Hydroxyhydrindone (5-Hydroxyindanone)

Yellow prisms from EtOH. M.p. 183° decomp. Sol. Et_2O , C_6H_6 , hot EtOH. Spar. sol. pet. ether.

Me ether: $C_{10}H_{10}O_2$. MW, 162. Needles from H_2O . M.p. 110° . Sol. usual org. solvents. Spar. sol. Et_2O , pet. ether. *Semicarbazone*: leaflets from AcOH.Aq. M.p. 239° . *Oxime*: needles from MeOH. M.p. 151° .

Semicarbazone: cryst. from EtOH. M.p. 223° decomp.

Auwers, Hilliger, *Ber.*, 1916, 49, 2412.

Ingold, Piggott, *J. Chem. Soc.*, 1923, 123, 1503.

6-Hydroxyhydrindone (6-Hydroxyindanone)

Needles from H_2O . M.p. 151 - 3° . $FeCl_3 \rightarrow$ violet col.

Me ether: plates from EtOH. M.p. 109° . *Oxime*: needles from EtOH. M.p. 133° .

Ingold, Piggott, *J. Chem. Soc.*, 1923, 123, 1492.

7-Hydroxyhydrindone (7-Hydroxyindanone)

Cryst. from EtOH. M.p. 111° . B.p. $144^\circ/20$ mm. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. pet. ether. Volatile in steam.

Acetyl: cryst. from Et_2O . M.p. 78° .

Semicarbazone: micro-cryst. from EtOH. M.p. 243° .

See previous reference and also

Auwers, Hilliger, *Ber.*, 1916, 49, 2412.

α -Hydroxyhydrocinnamic Acid (2-Phenyl-lactic acid, 1-hydroxy-2-phenylpropionic acid)



$C_9H_{10}O_3$

MW, 166

d.

Needles from H_2O . M.p. 124 - 6° (122°). Sol.

18

hot H₂O, MeOH, EtOH, Me₂CO, Et₂O, AcOEt, hot C₆H₆. Spar. sol. CHCl₃, pet. ether, CS₂. $[\alpha]_D^{20} + 22.2^\circ$ in H₂O.

Me ester: C₁₀H₁₂O₃. MW, 180. M.p. 48.5°.

Et ester: C₁₁H₁₄O₃. MW, 194. Needles from H₂O. M.p. 46–7°. B.p. 152–4°/20 mm. $[\alpha]_D^{17.5} + 22.5^\circ$ in C₆H₆.

Amide: C₉H₁₁O₂N. MW, 165. Plates from C₆H₆. M.p. 112–13°. $[\alpha]_D^{20} + 81.4^\circ$ in EtOH.

Et-amide: C₁₁H₁₅O₂N. MW, 193. Plates from C₆H₆-pet. ether. M.p. 56–56.5°. Sol. H₂O, EtOH, Et₂O, C₆H₆. Spar. sol. pet. ether.

l.

Needles from H₂O. M.p. 124–5°. $[\alpha]_D^{12} - 18.7^\circ$ in EtOH. Sol. H₂O, EtOH, Et₂O.

Me ester: needles from EtOH. M.p. 48.5°. B.p. 155°/17 mm. $[\alpha]_D^{18.5} + 6.4^\circ$.

Et ester: m.p. 46–7°. B.p. 159–60°/26 mm. $[\alpha]_D^{13} - 22.6^\circ$ in C₆H₆.

dl.

Cryst. from CHCl₃ or C₆H₆. M.p. 97–8°. $k = 1.93 \times 10^{-4}$ at 25°. Dil. H₂SO₄ at 200° → 2-phenylnaphthalene.

Me ester: m.p. 33°. B.p. 143°/15 mm.

Et ester: b.p. 156°/20 mm.

Phenyl ether: C₁₅H₁₄O₃. MW, 242. M.p. 81°. Sol. hot H₂O, EtOH. Insol. cold H₂O.

Amide: plates from C₆H₆. M.p. 111–12°. Sol. H₂O, EtOH. Spar. sol. C₆H₆.

Nitrile: phenylacetaldehyde cyanhydrin. C₉H₉ON. MW, 147. Needles from C₆H₆. M.p. 57–8°. Sol. EtOH, Et₂O, CHCl₃. Spar. sol. hot pet. ether.

Acetyl: m.p. 72°.

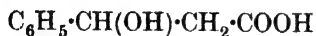
Darapsky, *J. prakt. Chem.*, 1917, **96**, 308.

McKenzie, Wren, *J. Chem. Soc.*, 1910, **97**, 1358.

Dakin, Dudley, *J. Biol. Chem.*, 1914, **18**, 44.

Biquard, *Ann. chim.*, 1933, **20**, 137.

β-Hydroxyhydrocinnamic Acid (2-Phenylhydracrylic acid, 2-hydroxy-2-phenylpropionic acid)



C₉H₁₀O₃ MW, 166

d.

Cryst. from C₆H₆. M.p. 115–16°. $[\alpha]_D^{15} + 19.2^\circ$ in EtOH. Conc. HCl → cinnamic acid.

Me ester: C₁₀H₁₂O₃. MW, 180. $[\alpha]_D + 14.1^\circ$ in EtOH.

Amide: C₉H₁₁O₂N. MW, 165. Needles from C₆H₆. M.p. 105–6°. $[\alpha]_D^{15} + 38.4^\circ$ in EtOH. Sol. H₂O, EtOH, Et₂O. Spar. sol. CHCl₃, C₆H₆, CS₂.

l.

Needles from C₆H₆. M.p. 115–16°. $[\alpha]_D - 18.9^\circ$ in EtOH.

Me ester: $[\alpha]_D - 17.0^\circ$ in EtOH.

Et-amide: C₁₁H₁₅O₂N. MW, 193. Needles from C₆H₆-pet. ether. M.p. 108–9°. $[\alpha]_D^{15.5} - 26.2^\circ$ in EtOH. Sol. H₂O, EtOH, Et₂O, CHCl₃. Spar. sol. pet. ether, C₆H₆, CS₂.

dl.

Prisms from H₂O. M.p. 96°. Sol. H₂O, MeOH, EtOH, Me₂CO. Spar. sol. pet. ether, C₆H₆. $k = 4.0 \times 10^{-5}$ at 25°.

Me ester: b.p. 158–61°/17–18 mm.

Et ester: C₁₁H₁₄O₃. MW, 194. B.p. 160°/15–16 mm., 135°/9–10 mm. Sol. H₂O.

Me ether: C₁₀H₁₂O₃. MW, 180. Plates from pet. ether. M.p. 98°. Sol. EtOH, Et₂O, CHCl₃, AcOEt, CCl₄, C₆H₆, warm pet. ether. *Me ester*: C₁₁H₁₄O₃. MW, 194. B.p. 253°.

Et ether: C₁₁H₁₄O₃. MW, 194. Plates from pet. ether. M.p. 75°. Sol. H₂O. *Me ester*: C₁₂H₁₆O₃. MW, 208. B.p. 256°.

Phenyl ether: C₁₅H₁₄O₃. MW, 242. Needles from C₆H₆. M.p. 150–1°.

Acetyl: m.p. 100–1°.

Posner, *Ber.*, 1905, **38**, 2319.

Schrauth, Schoeller, Struensee, *Ber.*, 1911, **44**, 1436.

See also first reference above.

2-Hydroxyhydrocinnamic Acid.

See Melilotic Acid.

3-Hydroxyhydrocinnamic Acid.

See *m*-Hydrocoumaric Acid.

4-Hydroxyhydrocinnamic Acid.

See Phloretic Acid.

Hydroxyhydroquinone.

See 1 : 2 : 4-Trihydroxybenzene.

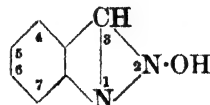
5-Hydroxy-2-hydroxymethyl-γ-pyrone.

See Kojic Acid.

Hydroxyindane.

See Hydroxyhydrindene.

2-Hydroxyindazole (N-Hydroxyindazole, 2-indazblol)



C₇H₆ON₂

MW, 134

Needles from H₂O. M.p. 139–139.5°. Sol. EtOH, hot C₆H₆. Mod. sol. Et₂O, ligroin. Spar. sol. H₂O, pet. ether. FeCl₃ → orange-red col. Sn + HCl → indazole. Polymerises.

Bamberger, Demuth, *Ber.*, 1902, **35**, 1891.

3-Hydroxyindazole (3-Indazolol).

Plates from EtOH or AcOH. M.p. 206°. Sol. Me₂CO, hot AcOEt. Spar. sol. H₂O, Et₂O, C₆H₆. Alc. FeCl₃ → blue col.

2-Acetyl: cryst. from AcOH. M.p. 188°. Sol. hot AcOH. Spar. sol. H₂O, EtOH, Me₂CO, C₆H₆, AcOEt. Insol. Et₂O, CHCl₃. No col. with alc. FeCl₃.

Heller, Köhler, *Ber.*, 1923, **56**, 1598.

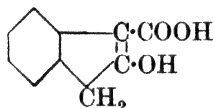
Hantzsch, *Ber.*, 1925, **58**, 680.

6-Hydroxyindazole (6-Indazolol).

Plates from H₂O. M.p. 215–16°. Sol. hot H₂O. Spar. sol. Et₂O. Sublimes.

Witt, Nölting, Grandmougin, *Ber.*, 1890, **23**, 3641; *Ber.*, 1892, **25**, 3152.

Fries, Roth, *Ann.*, 1914, **404**, 84.

2-Hydroxyindene-3-carboxylic Acid (2-Hydroxyindene-1-carboxylic acid)

C₁₀H₈O₃

MW, 176

Et ester: C₁₂H₁₂O₃. MW, 204. Cryst. from EtOH. M.p. 68–9°. Reacts acid. Alc. FeCl₃ → intense blue col.

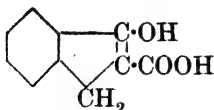
Cu salt: greyish-brown cryst., m.p. 222°.

Nitrile: C₁₀H₇ON. MW, 157. Leaflets from EtOH.Aq. M.p. 172° decomp. Sol. AcOH.

Me ether: C₁₁H₉ON. MW, 171. Needles from MeOH. M.p. 88°. B.p. 195°/25 mm. *Et ether*: C₁₂H₁₁ON. MW, 185. Needles from EtOH. M.p. 84°. B.p. 212°/25 mm. *Benzoate*: needles from EtOH. M.p. 123°.

Moore, Thorpe, *J. Chem. Soc.*, 1908, **93**, 178.

Dieckmann, *Ber.*, 1922, **55**, 2489.

3-Hydroxyindene-2-carboxylic Acid (1-Hydroxyindene-2-carboxylic acid)

C₁₀H₈O₃

MW, 176

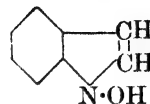
Et ester: C₁₂H₁₂O₃. MW, 204. Oil. B.p. 185°/20 mm. *Cu salt*: cryst. from C₆H₆ or CHCl₃, m.p. 195–9°.

Nitrile: C₁₀H₇ON. MW, 157. Needles from EtOH.Aq. M.p. 73°. Steam + dil. H₂SO₄ → 1-hydrindone. Alc. FeCl₃ → green col. *Me ether*: C₁₁H₉ON. MW, 171. Oil. B.p. 185°/

20 mm. *Benzoate*: needles from EtOH. M.p. 101–5°.

See last reference above and also

Mitchell, Thorpe, *J. Chem. Soc.*, 1910, **97**, 2277.

N-Hydroxyindole (1-Hydroxyindole, 1-indolol)

C₈H₇ON

MW, 133

Brown cryst. M.p. 160°. Insol. dil. min. acids. Does not form picrate. Conc. H₂SO₄ → intense green col.

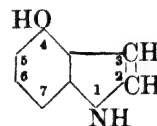
Ingraffia, *Gazz. chim. ital.*, 1933, **63**, 175.

2-Hydroxyindole.

See Oxindole.

3-Hydroxyindole.

See Indoxyl.

4-Hydroxyindole (4-Indolol)

C₈H₇ON

MW, 133

Me ether: C₉H₉ON. MW, 147. Needles from pet. ether. M.p. 69·5°. *Picrate*: red needles from EtOH. M.p. 159–60°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, **125**, 328.

5-Hydroxyindole (5-Indolol).

Me ether: C₉H₉ON. MW, 147. Needles from pet. ether. M.p. 55°. B.p. 176–8°/17 mm. Spar. sol. hot H₂O. Slightly volatile in steam. *N-Acetyl*: needles from EtOH. M.p. 82°. B.p. 210–11°/25 mm. *Picrate*: red needles from EtOH. M.p. 145°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, **125**, 322.

6-Hydroxyindole (6-Indolol).

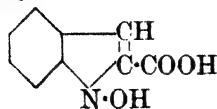
Me ether: C₉H₉ON. MW, 147. Plates from pet. ether. M.p. 91–2°. *Picrate*: red needles from C₆H₆-pet. ether. M.p. 137°.

Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1922, **121**, 1879.

7-Hydroxyindole (7-Indolol).

Me ether: C₉H₉ON. MW, 147. B.p. 157°/17 mm., 159–61°/21 mm. Volatile in steam. *Picrate*: red needles. M.p. 156°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, **125**, 327.

N-Hydroxyindole-2-carboxylic Acid (1-Indolol-2-carboxylic acid) $C_9H_7O_3N$

MW, 177

Prisms from $Me_2CO.Aq.$ M.p. 159.5° decomp. Sol. EtOH, Me_2CO , Et_2O , AcOH. Mod. sol. H_2O . Spar. sol. C_6H_6 , $CHCl_3$, ligroin. $FeCl_3 \rightarrow$ blue col. Reduces warm Fehling's. Conc. $H_2SO_4 \rightarrow$ blue col. on warming. Cold conc. $H_2SO_4 \rightarrow$ indigo. $Zn + AcOH \rightarrow$ indole-1-carboxylic acid. $CrO_3 + AcOH \rightarrow$ isatin.

Me ester: $C_{10}H_9O_3N$. MW, 191. Needles from ligroin. M.p. $100-1^\circ$.

Et ester: $C_{11}H_{11}O_3N$. MW, 205. Prisms from ligroin. M.p. 65° . Volatile in steam. *Acetyl*: needles from EtOH. M.p. $76-7^\circ$. *Benzoyl*: cryst. from EtOH. M.p. $104-5^\circ$.

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from $Me_2CO.Aq.$ M.p. 185° decomp. Sol. hot EtOH, Et_2O , C_6H_6 , Me_2CO . Spar. sol. H_2O , ligroin. Does not reduce Fehling's. $NaHg \rightarrow$ indole-2-carboxylic acid. *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Cryst. from ligroin. M.p. 68° . Sol. usual org. solvents. *Chloride*: $C_{10}H_8O_2NCl$. MW, 209.5. Needles from ligroin. M.p. 61° . Sol. usual org. solvents. *Amide*: $C_{10}H_{10}O_2N_2$. MW, 190. Plates from H_2O . M.p. 108° . Sol. most org. solvents. Spar. sol. H_2O , ligroin.

Acetyl: needles from $Me_2CO.Aq.$ M.p. 161° . Sol. EtOH, Et_2O , Me_2CO . Spar. sol. H_2O , ligroin.

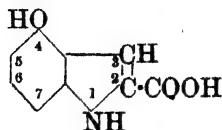
Benzoyl: cryst. from C_6H_6 . M.p. 151° decomp. Sol. hot EtOH, Et_2O , Me_2CO , $CHCl_3$. Spar. sol. ligroin.

Reissert, *Ber.*, 1896, 29, 646.

Gabriel, Gerhardt, Wolter, *Ber.*, 1923, 56, 1025.

3-Hydroxyindole-2-carboxylic Acid.

See Indoxylic Acid.

4-Hydroxyindole-2-carboxylic Acid (4-Indolol-2-carboxylic acid) $C_9H_7O_3N$

MW, 177

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from H_2O . M.p. $234-5^\circ$ decomp. *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Plates from EtOH.

M.p. 143.5° . *Et ester*: $C_{12}H_{13}O_3N$. MW, 219. Needles from EtOH. M.p. 161.5° .

Blaikie, Perkin, *J. Chem. Soc.*, 1924, 125, 312.

5-Hydroxyindole-2-carboxylic Acid (5-Indolol-2-carboxylic acid).

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from H_2O . M.p. $196-7^\circ$ decomp. Sol. EtOH, Et_2O , AcOH. Spar. sol. hot H_2O , C_6H_6 . *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Plates from MeOH. M.p. 177° . *Et ester*: $C_{12}H_{13}O_3N$. MW, 219. Needles from EtOH. M.p. 156° .

Blaikie, Perkin, *J. Chem. Soc.*, 1924, 125, 309.

6-Hydroxyindole-2-carboxylic Acid (6-Indolol-2-carboxylic acid).

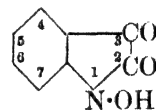
Me ether: $C_{10}H_9O_3N$. MW, 191. Sandy cryst. M.p. $196-7^\circ$. Sol. EtOH, AcOH. Above m.p. \rightarrow 6-methoxyindole.

Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1921, 119, 1632.

7-Hydroxyindole-2-carboxylic Acid (7-Indolol-2-carboxylic acid).

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from H_2O . M.p. 182° . *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Plates from MeOH. M.p. 120° . *Et ester*: $C_{12}H_{13}O_3N$. MW, 219. Needles from EtOH. M.p. 114.8° .

Blaikie, Perkin, *J. Chem. Soc.*, 1924, 125, 311.

N-Hydroxyisatin (1-Hydroxyisatin) $C_8H_5O_3N$

MW, 163

Orange-red needles from AcOH. M.p. $200-1^\circ$ ($192-3^\circ$). Sol. EtOH, Me_2CO . Spar. sol. H_2O , Et_2O . Sol. Na_2CO_3 , $NaHCO_3 \rightarrow$ violet col. Conc. $H_2SO_4 \rightarrow$ brownish-red col. \rightarrow blue on addn. of C_6H_6 . Hot dil. $H_2SO_4 \rightarrow$ anthroxanic acid.

Acetyl: orange-red plates from C_6H_6 . M.p. $151-2^\circ$.

Mono-phenylhydrazone: yellow cryst. from EtOH. M.p. 220° ($218-19^\circ$).

Di-phenylhydrazone: orange cryst. from EtOH. M.p. 173° (169°) decomp.

Heller, *Ber.*, 1906, 39, 2345.

Alessandri, *Gazz. chim. ital.*, 1927, 57, 195.

Arndt, Eistert, Partale, *Ber.*, 1927, 60, 1367.

5-Hydroxyisatin.

Me ether: $C_9H_7O_3N$. MW, 177. Reddish-brown powder. M.p. 201–2°. Sol Me_2CO , $AcOH$. Mod. sol. $EtOH$, $AcOEt$. Spar. sol. H_2O , Et_2O , C_6H_6 , $CHCl_3$. Insol. pet. ether, CS_2 , CCl_4 .

Anil: $C_{15}H_{12}O_2N_2$. MW, 252. Orange needles from amyl alcohol. M.p. 223°. Sol. Me_2CO , $CHCl_3$, $AcOH$. Mod. sol. $AcOEt$. Spar. sol. $EtOH$, Et_2O , C_6H_6 , CS_2 .

N-Acetyl: red prisms or needles from $CHCl_3$ -pet. ether. M.p. 144–5°. Sol Me_2CO , C_6H_6 , $CHCl_3$, $AcOH$, $AcOEt$. Spar. sol. $EtOH$, Et_2O , CS_2 , CCl_4 . Insol. H_2O , pet. ether.

Halberkann, *Ber.*, 1921, 54, 3087.

 α -Hydroxyisoamylbenzene.

See Isobutylphenylcarbinol.

Hydroxyisoamylbenzene.

See Isoamylphenol.

1-Hydroxyisobutane-1 : 1-dicarboxylic Acid.

See Isopropyltartronic Acid.

Hydroxyisobutylacetic Acid.

See Hydroxyisocaproic Acid.

2-Hydroxyisobutylamine.

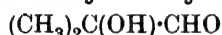
See Aminotrimethylcarbinol.

 α -Hydroxyisobutylbenzene.

See Isopropylphenylcarbinol.

 β -Hydroxyisobutylbenzene.

See Dimethyl-benzylcarbinol.

1-Hydroxyisobutyraldehyde

$C_4H_8O_2$ MW, 88

B.p. 137°, 50–5°/32 mm. Polymerises.

Franke, *Monatsh.*, 1900, 21, 1127.

Dworzak, *Pierri, Monatsh.*, 1929, 52, 144.

Avy, *Bull. soc. chim.*, 1931, 49, 15.

1-Hydroxyisobutyric Acid (Acetonic acid)

$C_4H_8O_3$ MW, 104

Hygroscopic prisms. Sublimes at 50°. M.p. 79°. B.p. 212°, 114°/12 mm., 84°/1.5 mm. Volatile in steam. Very sol. H_2O , $EtOH$, Et_2O , hot C_6H_6 . Spar. sol. cold C_6H_6 . $k = 1.06 \times 10^{-4}$ at 25°.

Me ester: $C_5H_{10}O_3$. MW, 118. B.p. 137°.

Et ester: $C_6H_{12}O_3$. MW, 132. B.p. 150°.

Amide: $C_4H_9O_2N$. MW, 103. Plates from Me_2CO . M.p. 98° (96°). B.p. 260°. Very sol. $EtOH$, H_2O .

Nitrile: acetone cyanhydrin. C_4H_7ON . MW, 85. M.p. –19°. B.p. 82°/23 mm. D_4^{20} 0.93. n_D^{20} 1.3996. Very sol. H_2O and most org. solvents except pet. ether.

Me ether: 1-methoxyisobutyric acid. $C_5H_{10}O_2$. MW, 118. *Me ester*: $C_6H_{12}O_2$. MW, 132. B.p. 134–7°/755 mm.

Et ether: 1-ethoxyisobutyric acid. $C_6H_{12}O_3$. MW, 132. B.p. 180°/741 mm. D_{16}^{20} 1.0101. Sol. hot H_2O .

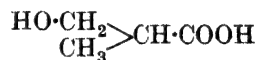
Acetyl: 1-acetoxyisobutyric acid. Needles from CS_2 . M.p. 61°. *Nitrile*: b.p. 180–2°. D^{19} 0.997.

Anschütz, Motschmann, *Ann.*, 1912, 392, 108.

Hepworth, *J. Chem. Soc.*, 1919, 115, 1207.

Bucherer, Grotee, *Ber.*, 1906, 39, 1225.

Rule, Harrower, *J. Chem. Soc.*, 1930, 2326.

2-Hydroxyisobutyric Acid (1-Methylhydracrylic acid)

$C_4H_8O_3$ MW, 104

Liq. Misc. with H_2O .

Na salt: cryst. from $EtOH$.

Et ester: $C_6H_{12}O_3$. MW, 132. B.p. 76°/8 mm.

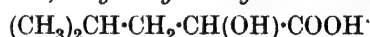
Acetyl: 2-acetoxyisobutyric acid. B.p. 132°/8 mm. *Et ester*: b.p. 75°/7 mm.

Lactone: $C_4H_6O_2$. MW, 86. B.p. 49–50°/10 mm. D_{20}^{20} 1.053.

Phenylurethane: m.p. 122°.

Blaise, Herman, *Ann. chim.*, 1909, 17, 390.

Johannson, *Chem. Zentr.*, 1916, II, 558.

1-Hydroxyisocaproic Acid (Leucic acid, leucinic acid, 1-hydroxyisobutylacetic acid)

$C_6H_{12}O_3$ MW, 132

dl.

Prisms from Et_2O -pet. ether. M.p. 80–1°. $[\alpha]_D^{20} + 26.3^\circ$ (27.6° in 1% $NaOH$).

l.

Cryst. from Et_2O . M.p. 81–2° after sintering at 78°. $[\alpha]_D^{20} - 27.8^\circ$ in 1% $NaOH$. Sublimes. Very sol. H_2O , $EtOH$, Et_2O .

Et ester: $C_8H_{16}O_3$. MW, 160. B.p. 79–80°/12 mm. $[\alpha]_D^{20} - 11.07^\circ$.

Acetyl: b.p. 155–7°/20 mm. *Me ester*: b.p. 103–4°/20 mm. *Et ester*: b.p. 120–1°/20 mm.

Chloride: b.p. 87°/7 mm.

dl.

Plates from Et_2O -pet. ether. M.p. 76–7°.

Et ester: b.p. 80–1°/16 mm. Very sol. $EtOH$, Et_2O . Spar. sol. H_2O .

Amide: $C_6H_{13}O_2N$. MW, 131. M.p. 51–2°.

Nitrile: isovaleraldehyde cyanhydrin. $C_6H_{11}ON$. MW, 113. Decomp. on dist. to isovaleraldehyde + HCN. *Acetyl*: b.p. 204° . D^{19}_D 0.960.

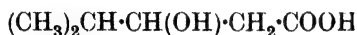
Scheibler, Wheeler, *Ber.*, 1911, **44**, 2686.

Henry, *Chem. Zentr.*, 1898, **II**, 662.

Abderhalden, Weil, *Z. physiol. Chem.*, 1913, **84**, 53.

Kodama, *Chem. Abstracts*, 1923, **17**, 2562.

2-Hydroxyisocaproic Acid (2-Hydroxyisobutylacetic acid)



$C_6H_{12}O_3$ MW, 132

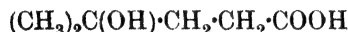
Syrup. B.p. $173-5^\circ/43$ mm., $165-6^\circ/35$ mm. Very sol. most org. solvents.

Et ether: 2-ethoxyisocaproic acid. $C_8H_{16}O_3$. MW, 160. *Et ester*: $C_{10}H_{20}O_3$. MW, 188. Oil. B.p. $75^\circ/8$ mm.

Linstead, *J. Chem. Soc.*, 1929, 2509.

Wogrinz, *Monatsh.*, 1903, **24**, 250.

3-Hydroxyisocaproic Acid (3-Hydroxyisobutylacetic acid)



$C_6H_{12}O_3$ MW, 132

Passes readily into the lactone.

NH_4 salt: cryst. from EtOH. M.p. 127° .

Ag salt: needles from H_2O . Very sol. hot H_2O .

Ba salt: cryst. from EtOH. Very sol. H_2O . Spar. sol. EtOH.

Amide: $C_6H_{13}O_2N$. MW, 131. Plates from $CHCl_3$. M.p. 101° . Very sol. EtOH. Spar. sol. $CHCl_3$. Insol. Et_2O , CS_2 , C_6H_6 .

Lactone: $C_6H_{10}O_2$. MW, 114. M.p. 10° . B.p. $205-7^\circ$, $95^\circ/20$ mm. D^{16}_D 1.01460. n^{16}_D 1.43541. Sol. 2 parts H_2O .

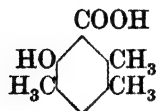
Ström, *J. prakt. Chem.*, 1893, **48**, 220.

Hepworth, *J. Chem. Soc.*, 1919, **115**, 1208.

Hydroxyisodurene.

See Isodurenol.

6-Hydroxy- γ -isodurylic Acid (6-Hydroxy-2:3:5-trimethylbenzoic acid, 3:5:6-trimethylsalicylic acid)



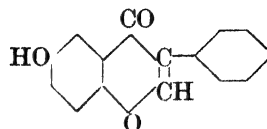
$C_{10}H_{12}O_3$ MW, 180

Needles from EtOH. M.p. 181° . Sol. Et_2O . Spar. sol. other solvents. Sublimes. Alc. $FeCl_3$

\longrightarrow blue col. Heat above m.p. \longrightarrow 5-hydroxy- ψ -cumene.

Krohn, *Ber.*, 1888, **21**, 884.

7-Hydroxyisoflavone



$C_{15}H_{10}O_3$ MW, 238

Leaflets from EtOH. M.p. 215° . $H_2SO_4 \longrightarrow$ sky-blue fluorescence.

Acetyl: needles from EtOH. M.p. 139° .

Me ether: $C_{16}H_{12}O_3$. MW, 252. Plates from EtOH. M.p. 156° .

Benzyl ether: plates from EtOH. M.p. 171° .

Mahal, Rai, Venkataamaran, *J. Chem. Soc.*, 1934, 1121.

Baker, Robinson, *J. Chem. Soc.*, 1925, 1986.

2-Hydroxyisohexptane.

See 2-Methylhexanol-2.

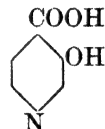
3-Hydroxyisohexane.

See Ethylisopropylcarbinol.

α -Hydroxyisohexylbenzene.

See Isoamylphenylcarbinol.

3-Hydroxyisonicotinic Acid (3-Hydroxypyridine-4-carboxylic acid)



$C_6H_5O_3N$ MW, 139

Leaflets or needles from H_2O . M.p. 315° (312°) decomp. Heat \longrightarrow 3-hydroxypyridine.

Kirpal, *Monatsh.*, 1902, **23**, 936.

Meyer, Graf, *Ber.*, 1928, **61**, 2214.

2-Hydroxyisophthalaldehyde (2:6-Dialdehydophenol)



$C_8H_6O_3$ MW, 150

Yellow needles from H_2O . M.p. 125° (88°). $FeCl_3 \longrightarrow$ reddish-violet col. KOH fusion \longrightarrow 2-hydroxyisophthalic acid. Volatile in steam. Forms bisulphite comp.

Voswinckel, *Ber.*, 1882, **15**, 2023.

Weil, Brimmer, *Ber.*, 1922, **55**, 304.

4-Hydroxyisophthalaldehyde (2 : 4-Dialdehydophenol).

Yellow needles from H_2O . M.p. 113° (108°). Sol. Et_2O , CHCl_3 . Mod. sol. EtOH . Spar. sol. hot H_2O . Insol. ligroin. $\text{FeCl}_3 \rightarrow$ red col. KOH fusion \rightarrow 4-hydroxyisophthalic acid. Forms bisulphite comp.

Voswinckel, *Ber.*, 1882, 15, 2022.

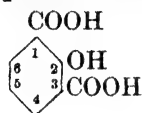
Weil, Brimmer, *Ber.*, 1922, 55, 305.

4-Hydroxyisophthalaldehydic Acid.

See 4-Hydroxy-3-aldehydobenzoic Acid.

6-Hydroxyisophthalaldehydic Acid.

5-Aldehydosalicilic Acid, *q.v.*

2-Hydroxyisophthalic Acid

$\text{C}_8\text{H}_6\text{O}_5$

MW, 182

Needles + H_2O from H_2O , m.p. 239° ; anhyd. $243-4^\circ$. Very sol. EtOH , Et_2O . Mod. sol. CHCl_3 . Sol. 700 parts cold H_2O , 35-40 parts boiling H_2O . $\text{FeCl}_3 \rightarrow$ cherry-red col. Aq. and alc. sols. show blue fluor.

Mono-Me ester: $\text{C}_9\text{H}_8\text{O}_5$. MW, 196. Needles. M.p. 135° . *Amide*: $\text{C}_9\text{H}_9\text{O}_4\text{N}$. MW, 195. Needles from H_2O or MeOH . M.p. 185° .

Di-Me ester: $\text{C}_{10}\text{H}_{10}\text{O}_5$. MW, 210. M.p. 72° . Very sol. EtOH , Et_2O , C_6H_6 .

Mono-amide: $\text{C}_8\text{H}_7\text{O}_4\text{N}$. MW, 181. Needles from H_2O or MeOH . M.p. 245° decomp. $\text{FeCl}_3 \rightarrow$ wine-red col.

Me ether: 2-methoxyisophthalic acid. $\text{C}_9\text{H}_8\text{O}_5$. MW, 196. Prisms from H_2O . M.p. $216-18^\circ$ with decomp. and sublimation. Very sol. H_2O , EtOH , Et_2O . $\text{FeCl}_3 \rightarrow$ yellow ppt.

Tiemann, Reimer, *Ber.*, 1877, 10, 1570.

Graebe, Kraft, *Ber.*, 1906, 39, 799.

Wohl, *Ber.*, 1910, 43, 3486.

4-Hydroxyisophthalic Acid.

Needles from H_2O . M.p. 310° . Very sol. EtOH , Et_2O , hot AcOH . Sol. 5000 parts H_2O at 10° , 158.5 parts at 100° . $\text{FeCl}_3 \rightarrow$ cherry-red col.

Di-Me ester: needles from MeOH . Aq. M.p. 96° .

Mono-Et ester: $\text{C}_{10}\text{H}_{10}\text{O}_5$. MW, 210. Plates from EtOH . Aq. M.p. $194-5^\circ$.

Di-Et ester: $\text{C}_{12}\text{H}_{14}\text{O}_5$. MW, 238. Needles from EtOH . M.p. 52° . Sol. most org. solvents. Insol. H_2O .

Diamide: $\text{C}_8\text{H}_5\text{O}_3\text{N}_2$. MW, 180. Plates from EtOH . M.p. 250° . Spar. sol. hot EtOH .

Me ether: 4-methoxyisophthalic acid.

Needles from H_2O . M.p. 261° . Very sol. EtOH . Sol. Et_2O . Insol. H_2O , CHCl_3 , C_6H_6 .

Schall, *Ber.*, 1879, 12, 828.

Ost, *J. prakt. chem.*, 1876, 14, 104.

Loewenhertz, *Ber.*, 1892, 25, 2796.

5-Hydroxyisophthalic Acid.

Needles + $2\text{H}_2\text{O}$ from H_2O . M.p. $284-5^\circ$ (288°). Sublimes in needles. Very sol. EtOH , Et_2O . Sol. C_6H_6 . Sol. 3280 parts H_2O at 5° , 5.4 parts at 100° .

Di-Me ester: needles. M.p. $159-60^\circ$.

Di-Et ester: prisms. M.p. 103° . Sol. EtOH , Et_2O . Spar. sol. H_2O .

Me ether: 5-methoxyisophthalic acid. Needles from AcOH . M.p. 270° .

Kruber, Schmidt, *Ber.*, 1931, 64, 2276.

Heine, *Ber.*, 1880, 13, 494.

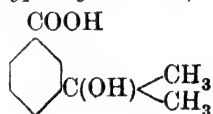
Lönnies, *ibid.*, 705.

3-Hydroxy-4-isopropyl-6-aldehydo-o-toluic Acid.

See Formylthymotinic Acid.

 α -Hydroxyisopropylbenzene.

See Dimethyl-phenylcarbinol.

3- α -Hydroxyisopropylbenzoic Acid (*Dimethyl-m-carboxyphenylcarbinol*)

$\text{C}_{10}\text{H}_{12}\text{O}_3$

MW, 180

Plates from H_2O . M.p. $123-4^\circ$.

Wallach, *Ann.*, 1893, 275, 159.

Hydroxy-4-isopropylbenzoic Acid.

See Hydroxycuminic Acid.

4-Hydroxy-2-isopropylcoumarone.

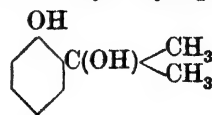
See Isotubanol.

4-Hydroxy-2-isopropylcoumarone-5-carboxylic Acid.

See Isotubaic Acid.

Hydroxyisopropylmalonic Acid.

See Isopropyltartronic Acid.

2- α -Hydroxyisopropylphenol (2-o-Hydroxyphenylisopropyl alcohol, dimethyl-o-hydroxyphenylcarbinol, α -2-dihydroxyisopropylbenzene)

$\text{C}_9\text{H}_{12}\text{O}_2$

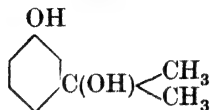
MW, 152

B.p. $135^\circ/15$ mm. Dist. at 760 mm. \rightarrow o-isopropylphenol.

Me ether: 2- α -hydroxyisopropylanisole. $\text{C}_{10}\text{H}_{14}\text{O}_2$. MW, 166. M.p. 15° . B.p. 239° .

Hoering, Baum, D.R.P., 208,886, (*Chem. Zentr.*, 1909, I, 1522).
Béhal, Tiffeneau, *Bull. soc. chim.*, 1908, 3, 315.

3- α -Hydroxyisopropylphenol (2-m-Hydroxyphenylisopropyl alcohol, dimethyl-m-hydroxyphenylcarbinol, α -3-dihydroxyisopropylbenzene)



$C_9H_{12}O_2$

MW, 152

Prisms from H_2O or C_6H_6 . M.p. 105–6°. Sol. EtOH, Et₂O. Spar. sol. cold H_2O . $FeCl_3 \rightarrow$ blue col.

Me ether: 3- α -hydroxyisopropylanisole. Needles from pet. ether. M.p. 34°. B.p. 242°/770 mm.

Auwers, *Ann.*, 1917, 413, 305.

Béhal, Tiffeneau, *Bull. soc. chim.*, 1908, 3, 316.

α -Hydroxy-4-isopropylphenylacetic Acid.
See 4-Isopropylmandelic Acid.

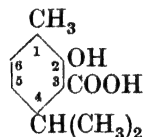
Hydroxyisopropyltoluene.

See Dimethyl-tolylcarbinol, Carvacrol, and Thymol.

Hydroxy-4-isopropyl-*o*-toluic Acid.

See Thymotinic Acid.

2-Hydroxy-4-isopropyl-*m*-toluic Acid (3-Methyl-6-isopropylsalicylic acid, *o*-carvacrotinic acid, carvacrol-3-carboxylic acid, 4-isopropyl-*o*-cresotinic acid)



$C_{11}H_{14}O_3$

MW, 194

Needles from H_2O . M.p. 136° (133–4°). Sol. EtOH, Et₂O. Spar. sol. cold H_2O . Sublimes. $FeCl_3 \rightarrow$ bluish-violet col.

Kekulé, Fleischer, *Ber.*, 1873, 6, 1089.

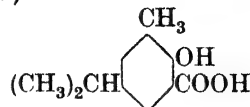
6-Hydroxy-4-isopropyl-*m*-toluic Acid (*p*-Carvacrotinic acid, carvacrol-6-carboxylic acid).

Me ether: 2-methyl-5-isopropylanisic acid. $C_{12}H_{16}O_3$. MW, 208. Needles from EtOH.Aq. M.p. 154–5°. *Amide*: $C_{12}H_{17}O_3N$. MW, 207. Needles from EtOH.Aq. M.p. 163–4°.

Et ether: $C_{13}H_{18}O_3$. MW, 222. Needles from H_2O . M.p. 133°. *Amide*: $C_{13}H_{19}O_3N$. MW, 221. Needles from EtOH.Aq. M.p. 133–4°.

Gattermann, *Ber.*, 1899, 32, 1120.

2-Hydroxy-5-isopropyl-*m*-toluic Acid (3-Methyl-5-isopropylsalicylic acid, 5-isopropyl-*o*-cresotinic acid)



$C_{11}H_{14}O_3$

MW, 194

Needles from H_2O . M.p. 147°. Sol. EtOH. Insol. cold H_2O . $FeCl_3 \rightarrow$ bluish-violet col.

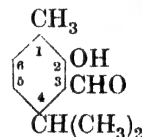
Me ester: $C_{12}H_{16}O_3$. MW, 208. Needles from EtOH. M.p. 148°.

Jesurun, *Ber.*, 1886, 19, 1414.

Hydroxy-4-isopropyl-*o*-toluic Aldehyde.

See Thymotinic Aldehyde.

2-Hydroxy-4-isopropyl-*m*-toluic Aldehyde (*o*-Carvacrotinic aldehyde, 3-methyl-6-isopropylsalicylaldehyde, 3-aldehydocarcavacrol)



$C_{11}H_{14}O_2$

MW, 178

Oil. Volatile in steam. Alc. $FeCl_3 \rightarrow$ dark green col.

Lustig, *Ber.*, 1886, 19, 14.

Gattermann, *Ann.*, 1907, 357, 330.

6-Hydroxy-4-isopropyl-*m*-toluic Aldehyde (*p*-Carvacrotinic aldehyde, 5-aldehydocarcavacrol).

Leaflets from ligroin. Needles from H_2O or AcOH.Aq. M.p. 96°. Sol. EtOH, Et₂O, C_6H_6 , $CHCl_3$. Spar. sol. hot H_2O . Non-volatile in steam. No col. with $FeCl_3$.

Me ether: $C_{12}H_{16}O_2$. MW, 208. B.p. 275°. *Azine*: m.p. 184–5°.

Phenylhydrazone: plates from AcOH. M.p. 109°.

Azine: yellow cryst. from EtOH. M.p. 238–40°.

Nordmann, *Ber.*, 1884, 17, 2633.

Lustig, *Ber.*, 1886, 19, 16.

Gattermann, *Ann.*, 1907, 357, 329.

α -Hydroxy-4-isopropyl- α -toluic Acid.

See 4-Isopropylmandelic Acid.

1-Hydroxyisoquinoline.

See Isocarbostryl.

7-Hydroxyisoquinoline



C_9H_7ON

MW, 145

Plates from EtOH. M.p. 226-7°. Spar. sol. EtOH.

Mé ether: $C_{10}H_9ON$. MW, 159. Needles from ligroin. M.p. 49°. B.p. 182-6°/34 mm. Sol. EtOH. Dil. acids \rightarrow bluish-violet fluor. *B.HCl*: m.p. 221°. $B_2H_2PtCl_6$: needles. M.p. 235-6° decomp. *Picrate*: m.p. 194-5°. *Methiodide*: m.p. 196-7°. *Ethiodide*: m.p. 178-9°.

Et ether: $C_{11}H_{11}ON$. MW, 173. M.p. 7-9°. B.p. 199°/50 mm., 182-3°/27 mm. D_{10}^{20} 1.0768. n_D^{20} 1.6062. *Picrate*: m.p. 202°. $B_2H_2PtCl_6$: red needles. M.p. 245°. *Methiodide*: m.p. 193-4°. *Ethiodide*: m.p. 122-3°.

$B_2H_2PtCl_6$: reddish-yellow needles. M.p. 252° decomp.

Fritsch, *Ann.*, 1895, **286**, 12, D.R.Ps., 85,566, 86,561.

8-Hydroxyisoquinoline.

Prisms from EtOH. M.p. 130°. Sol. EtOH. Insol. C_6H_6 , ligroin. Sublimes in needles.

B.HCl: yellow needles. M.p. 207°.

Methochloride: yellow needles + $1\frac{1}{2}H_2O$. M.p. anhyd. 259°.

Methiodide: yellow needles. M.p. 239°.

Ethiodide: yellow needles. M.p. 275°.

Claus, Raps, *J. prakt. Chem.*, 1892, **45**, 244.

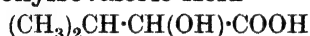
Claus, Gutzeit, *J. prakt. Chem.*, 1895, **52**, 10.

Weissgerber, *Ber.*, 1914, **47**, 3180.

Hydroxyisoquinoline-carboxylic Acid.

See Isocarboxystyryl-carboxylic Acid.

1-Hydroxyisovaleric Acid



$C_5H_{10}O_3$ MW, 118

M.p. 86°. Sol. H_2O , EtOH, Et_2O . Ox. \rightarrow isobutyric acid. Conc. HCl \rightarrow $H \cdot COOH$ + isobutyraldehyde.

Et ester: $C_7H_{14}O_3$. MW, 146. B.p. 174-6°. Spar. sol. H_2O .

Amide: $C_5H_{11}O_2N$. MW, 117. M.p. 104°.

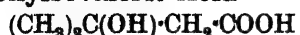
Nitrile: isobutyraldehyde cyanhydrin. C_5H_9ON . MW, 99. Liq. at -17°. B.p. 106°/22 mm. D_{16}^{16} 0.9543. n_D^{16} 1.4221. Sol. EtOH, Et_2O . Spar. sol. pet. ether. *Acetyl*: B.p. 193°. D_{16}^{16} 0.9745.

Schmidt, Sachtleben, *Ann.*, 1878, **193**, 106.

Lipp, *Ann.*, 1880, **205**, 24.

Nicolle, *Bull. soc. chim.*, 1926, **39**, 55.

2-Hydroxyisovaleric Acid



$C_5H_{10}O_3$ MW, 118

Syrup. Sol. H_2O , EtOH, Et_2O . HI \rightarrow 2-iodoisovaleric acid.

Et ester: b.p. 180°; 70°/13 mm.

Nitrile: m.p. -12°. B.p. 210-12°, 130-2°/30 mm. D_{20}^{20} 0.9676. n_D^{20} 1.4291. Sol. EtOH, Et_2O . Spar. sol. H_2O . *Acetyl*: b.p. 198-200°. D_{16}^{16} 0.9951. n_D^{16} 1.4193.

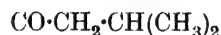
Kohn, *Monatsh.*, 1903, **24**, 767.

v. Miller, *Ann.*, 1880, **200**, 274.

Semljanzin, Saizew, *Ann.*, 1879, **197**, 73.

Lemaire, *Rec. trav. chim.*, 1910, **29**, 59.

p-Hydroxyisovalerophenone (4-Isovalerylphenol, isobutyl p-hydroxyphenyl ketone)



$C_{11}H_{14}O_2$

MW, 178

Prisms from Et_2O . M.p. 97-8°. Sol. ord. org. solvents.

Auwers, *Ber.*, 1903, **36**, 3891.

1-Hydroxy-2-keto-1 : 2-difurylthane.

See α -Furoin.

3-Hydroxy-2-ketodihydroindole.

See Dioxindole.

3-Hydroxy-4-keto-2 : 5-dimethylhexane.

See Isobutyroin.

Hydroxyketoheptane.

See Heptanolone.

Hydroxy-keto-hexane.

See Hexanolone.

2-Hydroxy-4-keto-2-methylpentane.

See Diacetone Alcohol.

1-Hydroxy-3-keto-3-phenyl-n-butyrac Acid.

See Phenacylglycollic Acid.

2-Hydroxy-1-ketopropionaldehyde.

See Glycerosone.

o-Hydroxylaminobenzoic Anhydride.

See Benzisoxazolone.

1-Hydroxylauric Acid



$C_{12}H_{24}O_3$

MW, 216

Cryst. from $CHCl_3$. M.p. 73-4°.

Et ester: $C_{14}H_{28}O_3$. MW, 244. Cryst. from pet. ether. M.p. 43°. *Acetyl*: b.p. 172-3°/13 mm.

Acetyl: cryst. from pet. ether. M.p. 47°.

Guérin, *Bull. soc. chim.*, 1903, **29**, 1124.

3-Hydroxylauric Acid

$\text{C}_{12}\text{H}_{24}\text{O}_3$ MW, 216

Needles from C_6H_6 -pet. ether. M.p. 62.5-63.5°. Heat \rightarrow lactone.

Lactone: yellow liq. B.p. 170-1°/11 mm. D_{15}^{20} 0.9382.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, 10, 114.

11-Hydroxylauric Acid.

See Sabinic Acid.

Hydroxylepidine.

See Hydroxy-4-methylquinoline.

Hydroxylepidine-carboxylic Acid.

See Hydroxy-methylquinoline-carboxylic Acid.

1-Hydroxylignoceric Acid.

See Cerebronic Acid, Addendum Vol. I, p. 697.

Hydroxylutidine.

See Hydroxydimethylpyridine.

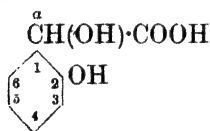
Hydroxymaleic Acid.

See Oxalacetic Acid.

Hydroxymalonic Acid.

See Tartronic Acid.

2-Hydroxymandelic Acid (2-Hydroxy-phenylglycollic acid, 2- α -dihydroxyphenylacetic acid, 2- α -dihydroxy- α -toluic acid)



$\text{C}_8\text{H}_8\text{O}_4$ MW, 168

d-.

2-Et ether: $\text{C}_{10}\text{H}_{12}\text{O}_4$. MW, 196. Cryst. from H_2O . M.p. 125.5-126.5°. $[\alpha]_D^{20} + 145.5^\circ$ in EtOH. Me ester: $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210. Cryst. $[\alpha]_D^{20} + 115^\circ$ in EtOH. Amide: $\text{C}_{10}\text{H}_{13}\text{O}_3\text{N}$. MW, 195. Cryst. from C_6H_6 . M.p. 124.5-125.5°. $[\alpha]_D^{20} + 125^\circ$ in EtOH.

l-.

2-Et ether: cryst. from H_2O . M.p. 125.5-126.5°. $[\alpha]_D^{20} - 144.9^\circ$ in EtOH. Me ester: cryst. from C_6H_6 -ligroin. M.p. 30-31°. B.p. 84-6°/0.02 mm. $[\alpha]_D^{20} - 130^\circ$ in EtOH. Amide: cryst. from C_6H_6 . M.p. 124.5-125.5°. $[\alpha]_D^{20} - 124^\circ$ in EtOH.

dl-.

Oil.

2-Me ether: $\text{C}_9\text{H}_{10}\text{O}_4$. MW, 182. Et ester: $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210. B.p. 108°/14 mm. D_{15}^{20} 1.16. n_D^{20} 1.521. Nitrile: $\text{C}_9\text{H}_9\text{O}_2\text{N}$. MW, 163. Cryst. from C_6H_6 . M.p. 71°. Sol. EtOH, Et_2O , CHCl_3 , C_6H_6 , ligroin. Insol. H_2O .

Benzoate of nitrile: cryst. from EtOH. M.p. 87-8°.

2-Et ether: cryst. from C_6H_6 . M.p. 102.5-103.5°. Me ester: cryst. from C_6H_6 . M.p. 71-2°. Amide: cryst. from C_6H_6 . M.p. 102.5-103.5°. Nitrile: $\text{C}_{10}\text{H}_{11}\text{O}_2\text{N}$. MW, 177. Cryst. M.p. 86-9°.

Baeyer, Fritsch, *Ber.*, 1884, 17, 974.

Francis, Davis, *J. Chem. Soc.*, 1909, 95, 1405.

Bistrzycki, Paulus, Perrin, *Ber.*, 1911, 44, 2611.

Lévy, Pernot, *Bull. soc. chim.*, 1931, 49, 1729.

Weissberger, Dym, *Ann.*, 1933, 502, 79.

3-Hydroxymandelic Acid (3-Hydroxy-phenylglycollic acid, 3- α -dihydroxyphenylacetic acid, 3- α -dihydroxy- α -toluic acid).

3-Me ether: $\text{C}_9\text{H}_{10}\text{O}_4$. MW, 182. Et ester: $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210. B.p. 169°/14 mm. D_{15}^{19} 1.17. n_D^{19} 1.519.

Lévy, Pernot, *Bull. soc. chim.*, 1931, 49, 1729.

4-Hydroxymandelic Acid (4-Hydroxy-phenylglycollic acid, 4- α -dihydroxyphenylacetic acid, 4- α -dihydroxy- α -toluic acid).

d-.

Plates + H_2O from H_2O . M.p. anhyd. 103-4°. $[\alpha]_D + 144.4^\circ$ in H_2O .

4-Me ether: $\text{C}_9\text{H}_{10}\text{O}_4$. MW, 182. Cryst. + $2\text{H}_2\text{O}$ from H_2O . M.p. 104-5°. $[\alpha]_D^{19} + 146.1^\circ$.

l-.

Cryst. + $\frac{1}{2}\text{H}_2\text{O}$ from H_2O . M.p. anhyd. 102-3°. $[\alpha]_D - 144.4^\circ$ in H_2O .

4-Me ether: cryst. + $2\text{H}_2\text{O}$ from H_2O . M.p. 104-5°. $[\alpha]_D^{19} - 145.24^\circ$.

dl-.

Plates + H_2O from H_2O , needles + H_2O from Et_2O -ligroin. M.p. anhyd. 107-8° (106°).

4-Me ether: prisms or plates from Et_2O -ligroin. M.p. 108-9°. Sol. hot H_2O , EtOH, Et_2O , CHCl_3 . D_{15}^{18} 1.397. Et ester: $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210. Needles from H_2O or ligroin. M.p. 47-8°. MW, 181. Plates from EtOH.Aq. M.p. 163-4° (159°). Insol. H_2O , Et_2O . Benzoate of amide: cryst. M.p. 155°. Sol. EtOH, CHCl_3 . Spar. sol. Et_2O . Insol. H_2O . Nitrile: anisaldehyde cyanhydrin. $\text{C}_9\text{H}_9\text{O}_2\text{N}$. MW, 163. Cryst. from C_6H_6 -pet. ether. M.p. 67° (57-8°, 63°). Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O . Benzoate of nitrile: leaflets from EtOH. M.p. 66-7°.

Amide: $\text{C}_9\text{H}_9\text{O}_2\text{N}$. MW, 167. Dib- cryst. from EtOH. M.p. 183-4°. Insol.

Nitrile: *p*-hydroxybenzaldehyde cyanhydrin.
 $C_8H_7O_2N$. MW, 149. **Dibenzoyl**: needles from $CHCl_3$ - Et_2O . M.p. $143-4^\circ$. Insol. H_2O , Et_2O .

Knorr, *Ber.*, 1904, **37**, 3173.

McCombie, Parry, *J. Chem. Soc.*, 1909, **95**, 585.

Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, **42**, 831.

Ellinger, Kotake, *Z. physiol. Chem.*, 1910, **65**, 409.

Bistrzycki, Paulus, Perrin, *Ber.*, 1911, **44**, 2597.

Aloy, Rabaut, *Bull. soc. chim.*, 1912, **11**, 390.

Hydroxymesitylene.

See Mesityl.

Hydroxymesitylenic Acid.

See 4-Hydroxy-3:5-dimethylbenzoic Acid.

4-Hydroxy-2-methoxyacetophenone.

See Isopæonol.

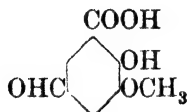
4-Hydroxy-3-methoxyacetophenone.

See Acetovanillone.

2-Hydroxy-4-methoxyacetophenone.

See Pæonol.

**2-Hydroxy-3-methoxy-5-aldehydobenz-
 oic Acid** (6-Hydroxy-5-methoxyisophthal-
 aldehydic acid, 3-methoxy-5-aldehydosalicyclic
 acid)



$C_9H_8O_5$

MW, 196

Cryst. from Me_2CO . M.p. 272° . $FeCl_3 \rightarrow$
 blue col.

Perkin, Stoye, *J. Chem. Soc.*, 1923, **123**,
 3175.

4-Hydroxy-3-methoxy-5-aldehydobenz- oic Acid.

See 5-Aldehydovanillic Acid.

2-Hydroxy-4-methoxy-3-aldehydoquin- oline.

See Dictamnol.

Hydroxymethoxyallylbenzene.

See Chavibetol and Eugenol.

Hydroxymethoxybenzyl Alcohol.

See Vanillyl Alcohol and Isovanillyl Alcohol.

2-[4-Hydroxy-3-methoxybenzyl]-3-[4- hydroxy-3-methoxybenzylidene]-butane.

See Guaiaretic Acid.

4-Hydroxy-3-methoxycinnamaldehyde

See Ferula-aldehyde.

4-Hydroxy-3-methoxycinnamic Acid.

See Ferulic Acid.

3-Hydroxy-4-methoxycinnamic Acid.

See Isoferulic Acid.

p-Hydroxy-*m*-methoxycinnamyl Alco- hol.

See Coniferyl Alcohol.

Hydroxymethoxydimethylbenzaldehyde.

See Rhizonaldehyde and Isorhizonaldehyde.

Hydroxymethoxydimethylbenzoic Acid.

See Rhizonic Acid and Isorhizonic Acid.

8-Hydroxy-6-methoxy-7-ethoxycou- marin.

See under Fraxetin.

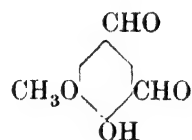
7-Hydroxy-4'-methoxyflavone.

See Pratol.

7-Hydroxy-4'-methoxyisoflavone.

See Formo-ononetin.

4-Hydroxy-5-methoxyisophthalalde- hyde (3:5-Dialdehydoguaiacol)



$C_9H_8O_4$

MW, 180

Yellow needles from $EtOH$. M.p. $119-21^\circ$.

Me ether: 4:5-dimethoxyisophthalaldehyde,
 3:5-dialdehydoveratrol. $C_{10}H_{10}O_4$. MW, 194.
 Needles from H_2O . M.p. $123-4^\circ$.

Monoxime: needles from C_6H_6 . M.p.
 $166-7^\circ$.

Dioxime: cryst. from $EtOH$. M.p. $185-6^\circ$.

Di-phenylhydrazone: yellow powder from
 $EtOH$. M.p. $188-91^\circ$.

Di-p-nitrophenylhydrazone: needles from
 $PhNO_2$. M.p. $286-7^\circ$ decomp.

Koetschet, Koetschet, *Helv. Chim. Acta*,
 1930, **13**, 485.

4-Hydroxy-3-methoxyphenylacetalde- hyde.

See Homovanillin.

4-Hydroxy-3-methoxyphenylacetic Acid.

See Homovanillic Acid.

Hydroxymethoxyphenylallyl Alcohol.

See Lubanol.

Hydroxymethoxypropenylbenzene.

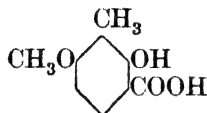
See Isochavibetol and Isoeugenol.

4-Hydroxy-3-methoxy-1-propylbenzene.

See Coerulignol.

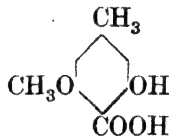
3-Hydroxy-4-methoxystyrene.

See Hesperetol.

5-Hydroxy-3-methoxy-*o*-toluic Acid.*See* Isoeverninic Acid.**3-Hydroxy-5-methoxy-*o*-toluic Acid.***See* Everninic Acid.**5-Hydroxy-4-methoxy-*m*-toluic Acid.***See under 4 : 5-Dihydroxy-*m*-toluic Acid.***2-Hydroxy-6-methoxy-*m*-toluic Acid (2-Hydroxy-3-methylanisic acid)** $C_9H_{10}O_4$

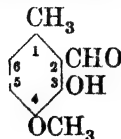
MW, 182

Needles from EtOH. M.p. 215–16° (210°) decomp.

Me ester : $C_{10}H_{12}O_4$. MW, 196. Needles from EtOH. M.p. 76–7°. Sol. EtOH, spar. sol. pet. ether.Herzig, Wenzel, Haiser, *Monatsh.*, 1903, 24, 905.Jones, Robertson, *J. Chem. Soc.*, 1932, 1690.**3-Hydroxy-5-methoxy-*p*-toluic Acid** $C_9H_{10}O_4$

MW, 182

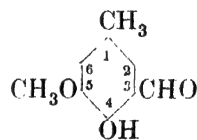
Cryst. from EtOH. M.p. 171–2° (169–70°) decomp.

Me ester : $C_{10}H_{12}O_4$. MW, 196. Needles from MeOH. M.p. 95–7°.Herzig, Wenzel, Kurzweil, *Monatsh.*, 1903, 24, 897.Asahina, Ihara, *Ber.*, 1929, 62, 1203.**5-Hydroxy-3-methoxy-*o*-toluic Aldehyde.***See* Isoeverninaldehyde.**3-Hydroxy-4-methoxy-*o*-toluic Aldehyde (4-Methyl-3-aldehydoguaiacol)** $C_9H_{10}O_3$

MW, 166

Cryst. from H_2O . M.p. 61–2°.*Semicarbazone* : needles from H_2O . Decomp. at 210° without melting.Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, 13, 480.**5-Hydroxy-4-methoxy-*o*-toluic Aldehyde.**Needles from EtOH. M.p. 175° (165°). Sol. Et_2O .*Semicarbazone* : plates from EtOH. M.p. 207°.

Heyden, D.R.P., 91,170.

Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, 13, 479.**3-Hydroxy-5-methoxy-*o*-toluic Aldehyde.***See* Everninaldehyde.**6-Hydroxy-5-methoxy-*o*-toluic Aldehyde (3-Hydroxy-2-methylanisaldehyde, 3-methyl-4-aldehydoguaiacol).**Leaflets from H_2O . M.p. 133–5°. Sol. MeOH. Spar. sol. H_2O . $FeCl_3$ in MeOH \rightarrow green col.*Me ether* : 3-methyl-4-aldehydoeveratrol. $C_{10}H_{12}O_3$. MW, 180. Needles from pet. ether. M.p. 52–3°.Perkin, *J. Chem. Soc.*, 1916, 109, 914.**5-Hydroxy-6-methoxy-*o*-toluic Aldehyde (6-Methyl-5-aldehydoguaiacol).**Cryst. from H_2O . M.p. 104–5–105.5°.Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, 13, 482.**4-Hydroxy-5-methoxy-*m*-toluic Aldehyde (3-Methoxy-5-methylsalicylaldehyde, 5-methyl-3-aldehydoguaiacol)** $C_9H_{10}O_3$

MW, 166

Yellow oil. B.p. 270–5°. Alc. $FeCl_3 \rightarrow$ green col.Tiemann, Koppe, *Ber.*, 1881, 14, 2026.**6-Hydroxy-5-methoxy-*m*-toluic Aldehyde (3-Methyl-4-aldehydoguaiacol).**Yellow needles from H_2O . M.p. 99°.*Phenylhydrazone* : plates from EtOH. M.p. 125°.Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, 13, 477.***N*-Hydroxymethylacetamide (Methylol-acetamide, acetylaminomethanol, acetylaminocarinol, acetylaminomethyl alcohol)** $C_3H_7O_2N$

MW, 89

Cryst. M.p. about 50–2°. Sol. H_2O , EtOH,

CHCl₃. Mod. sol. glycerol. Insol. Et₂O.
Reduces NH₃.AgNO₃.

Kalle, D.R.P., 164,610, (*Chem. Zentr.*, 1905, II, 1751).

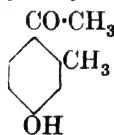
Einhorn, Ladisch, *Ann.*, 1905, **343**, 265.

Walter, E.P., 291,712, (*Chem. Abstracts*, 1929, **23**, 1136).

ω-Hydroxy-4-methylacetophenone.

See *p*-Methylphenacyl Alcohol.

4-Hydroxy-2-methylacetophenone (6-Aceto-*m*-cresol, methyl 4-hydroxy-*o*-tolyl ketone)



C₉H₁₀O₂ MW, 150
White cryst. from EtOH. M.p. 128°. B.p. 313°. Sol. EtOH, Et₂O. Spar. sol. cold H₂O. D₁₃₅ 1.0592. n_D¹³⁵ 1.5369. FeCl₃ → violet col. Does not form oxime.

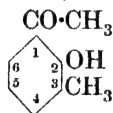
Me ether: C₁₀H₁₂O₂. MW, 164. M.p. 12°. B.p. 268°, 150°/20 mm. D₁₅ 1.0867. n_D¹⁵ 1.5503.

Et ether: C₁₁H₁₄O₂. MW, 178. M.p. 22°. B.p. 195°/80 mm., 155°/18 mm. D₇₇ 1.0034. n_D⁷⁷ 1.5142.

Nencki, Stoeber, *Ber.*, 1897, **30**, 1770.

Eijkmann, *Chem. Zentr.*, 1904, I, 1597.

2-Hydroxy-3-methylacetophenone (3-Aceto-*o*-cresol, methyl 2-hydroxy-*m*-tolyl ketone)



C₉H₁₀O₂ MW, 150
B.p. 106-7°/10.5 mm.

Semicarbazone: needles from EtOH. M.p. 228°.

Phenylhydrazone: m.p. 122°.

Azine: orange needles from EtOH. M.p. 237°.

Anschütz, Schöll, *Ann.*, 1911, **379**, 342.

4-Hydroxy-3-methylacetophenone (5-Aceto-*o*-cresol, methyl 4-hydroxy-*m*-tolyl ketone).

Prisms from H₂O. M.p. 104°. Sol. hot H₂O, EtOH, Et₂O. FeCl₃ → yellowish-brown col.

Klingel, *Ber.*, 1885, **18**, 2699.

Nencki, Stoeber, *Ber.*, 1897, **30**, 1770.

6-Hydroxy-3-methylacetophenone (3-Aceto-*p*-cresol, methyl 6-hydroxy-*m*-tolyl ketone).

Prisms from petrol. M.p. 50°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Sol. alkalis, conc. H₂SO₄.

Spar. sol. H₂O. D₄⁵³ 1.0797. n_D⁵³ 1.541. FeCl₃ → bluish-violet col.

Me ether: C₁₀H₁₂O₂. MW, 164. B.p. 254°, 132°/11 mm. D₁₃ 1.0694. n_D¹³ 1.538. *Semicarbazone*: m.p. 199°.

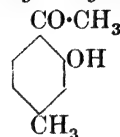
Oxime: needles from EtOH. M.p. 145°.

Semicarbazone: needles from EtOH. M.p. 212°.

Auwers, *Ann.*, 1909, **364**, 166.

Anschütz, Schöll, *Ann.*, 1911, **379**, 347.

2-Hydroxy-4-methylacetophenone (4-Aceto-*m*-cresol, methyl 2-hydroxy-*p*-tolyl ketone)



C₉H₁₀O₂ MW, 150
Cryst. M.p. 21°. B.p. 245°, 126°/20 mm., 103°/7 mm. D₁₃ 1.1012. n_D¹³ 1.5527. FeCl₃ → violet col.

Me ether: C₁₀H₁₂O₂. MW, 164. M.p. 37°. B.p. 265°. D₇₈ 1.0154. n_D⁷⁸ 1.5093. *Oxime*: m.p. 136°.

Et ether: C₁₁H₁₄O₂. MW, 178. M.p. 71°. B.p. 140°/10 mm. D₇₈ 0.9865. n_D⁷⁸ 1.4998. *Oxime*: m.p. 132°.

Oxime: m.p. 103°.

Semicarbazone: needles from EtOH. M.p. 214°.

Eijkmann, *Chem. Zentr.*, 1904, I, 1597.

Hydroxymethylacetylene.

See Propargyl Alcohol.

Hydroxymethylallene.

See 4-Hydroxy-1:2-butadiene.

α-Hydroxy-β-methylaminopropylbenzene.

See Ephedrine.

Hydroxymethyl *n*-amyl Ketone.

See 1-Heptanolone-2.

3-Hydroxy-2-methylanisaldehyde.

See 6-Hydroxy-5-methoxy-*o*-toluic Aldehyde.

6-Hydroxy-2-methylanisaldehyde.

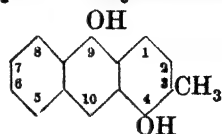
See Everninaldehyde.

6-Hydroxy-2-methylanisisic Acid.

See Everninic Acid.

2-Hydroxy-3-methylanisisic Acid.

See 2-Hydroxy-6-methoxy-*m*-toluic Acid.

4-Hydroxy-3-methylantranol

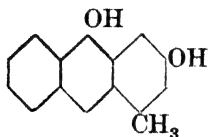
C₁₅H₁₂O₂

MW, 224

Cryst. from MeOH. M.p. 197°.

Perkin, Haddock, *J. Chem. Soc.*, 1933, 1519.

2-Hydroxy-4-methylanthranol (2-Hydroxy-4-methyl-9-anthrone)



$C_{15}H_{12}O_2$

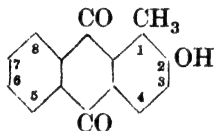
MW, 224

Needles from EtOH. M.p. 224°.

Diacetyl: prisms from EtOH. M.p. 172-3°.

Bistrzycki, de Schepper, *Ber.*, 1898, 31, 2795.

2-Hydroxy-1-methylanthraquinone



$C_{15}H_{10}O_3$

MW, 238

Yellow needles from AcOH. M.p. above 300°. Sol. EtOH, C_6H_6 , alkalis.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Yellow needles from MeOH. M.p. 184°. Sol. AcOH, EtOH. Sublimes. $H_2SO_4 \rightarrow$ scarlet sol.

Bentley, Gardner, Weizmann, *J. Chem. Soc.*, 1907, 91, 1631.

3-Hydroxy-1-methylanthraquinone.

Cryst. from EtOH. M.p. 285° (299-300°).

Me ether: $C_{16}H_{12}O_3$. MW, 252. Cryst. from MeOH. M.p. 128-9°.

Acetyl: cryst. M.p. 151-2° (134-5°).

Keimatsu, Hirano, Tanabe, *Journal of the Pharmaceutical Society, Japan*, 1929, 49, 531.

See also Bistrzycki, de Schepper, *Ber.*, 1898, 31, 2795.

4-Hydroxy-1-methylanthraquinone.

Brown needles from AcOH. M.p. 175-6° (170°). Sublimes in red needles. Sol. C_6H_6 , AcOH, toluene, warm ligroin. Bluish-red sols. in alkalis. Insol. NH_3 , Na_2CO_3 . Conc. $H_2SO_4 \rightarrow$ orange-red sol.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Orange-yellow needles from EtOH or AcOH. M.p. 128°. Sol. hot EtOH, Et_2O , C_6H_6 . Conc. $H_2SO_4 \rightarrow$ orange sol.

Acetyl: yellow needles from AcOH. M.p. 179-80°.

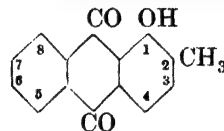
Baeyer, Drewson, *Ann.*, 1882, 212, 346.

Ullmann, Schmidt, *Ber.*, 1919, 52, 2103.

Ullmann, D.R.P., 292, 066, (*Chem. Zentr.*, 1916, I, 1211).

Fischer, Sapper, *J. prakt. Chem.*, 1911, 83, 207.

1-Hydroxy-2-methylanthraquinone



$C_{15}H_{10}O_3$

MW, 238

Orange-yellow needles from EtOH. M.p. 184-5° (178°). Sol. Et_2O , C_6H_6 . Spar. sol. EtOH. Insol. H_2O , NH_3 . Conc. $H_2SO_4 \rightarrow$ orange-red sol.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Cryst. M.p. 156-7°.

Phenyl ether: $C_{21}H_{14}O_3$. MW, 314. Yellow cryst. from AcOH. M.p. 190°. Sol. C_6H_6 , $PhNO_2$. Insol. EtOH, Et_2O . Conc. $H_2SO_4 \rightarrow$ wine-red sol.

Acetyl: orange-yellow plates from EtOH. M.p. 177°.

Römer, Link, *Ber.*, 1883, 16, 700.

Holdermann, *Ber.*, 1906, 39, 1257.

Ullmann, Bincer, *Ber.*, 1916, 49, 743.

Eder, Widmer, Bütler, *Helv. Chim. Acta*, 1924, 7, 353.

Keimatsu, Hirano, *Journal of the Pharmaceutical Society, Japan*, 1929, 49, 144.

3-Hydroxy-2-methylanthraquinone.

Yellow plates. M.p. 260-2° decomp. Sublimes in yellow plates. Sol. EtOH, Et_2O , AcOH.

Acetyl: yellow needles from AcOH. M.p. 177°. Sol. C_6H_6 . Spar. sol. EtOH.

Baeyer, Fraude, *Ann.*, 1880, 202, 163.

Bistrzycki, Zen-Ruffinen, *Helv. Chim. Acta*, 1920, 3, 378.

4-Hydroxy-2-methylanthraquinone.

Yellow needles from AcOH. M.p. 178°. Sol. EtOH, Me_2CO , C_6H_6 , $PhNO_2$. Mod. sol. Et_2O , ligroin. Conc. $H_2SO_4 \rightarrow$ orange-red sol. Bluish-red sols. in alkalis.

Me ether: cryst. M.p. 142-3°.

Acetyl: yellowish-green needles from EtOH. M.p. 156-7°. Sol. AcOH. Insol. H_2O . Conc. $H_2SO_4 \rightarrow$ orange-yellow sol.

Benzoyl: yellowish-green cryst. from EtOH. M.p. 228-9°. Sol. AcOH. Insol. H₂O.

Schmidt, Ullmann, *Ber.*, 1919, **52**, 2113.

Eder, Widmer, Büttler, *Helv. Chim. Acta*, 1924, **7**, 353.

Keimatsu, Hirano, Tanabe, *Journal of the Pharmaceutical Society, Japan*, 1929, **49**, 538.

Keimatsu, Hirano, *Journal of the Pharmaceutical Society, Japan*, 1931, **51**, 909.

5-Hydroxy-2-methylantraquinone.

Yellow needles from AcOH. M.p. 147°.

Acetyl: cryst. from EtOH. M.p. 172°.

Mitter, Sarkar, *J. Indian Chem. Soc.*, 1930, **7**, 625.

6-Hydroxy-2-methylantraquinone.

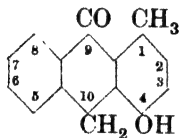
Yellow plates from EtOH. M.p. 278°.

Me ether: C₁₆H₁₂O₃. MW, 252. Yellow needles from EtOH. M.p. 177°.

Acetyl: yellow plates from EtOH. M.p. 145-7°.

Mitter, Sarkar, *J. Indian Chem. Soc.*, 1930, **7**, 627.

4-Hydroxy-1-methylanthrone



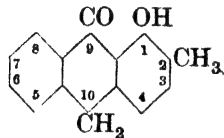
C₁₅H₁₂O₂

MW, 224

Needles from C₆H₆-pet. ether. M.p. 226-7°.

Steyermark, Gardner, *J. Am. Chem. Soc.*, 1930, **52**, 4891.

1-Hydroxy-2-methylanthrone



C₁₅H₁₂O₂

MW, 224

Yellow needles from C₆H₆-pet. ether or MeOH. M.p. 136-7°.

Diacetyl: prisms from EtOH. M.p. 180-2°.

Steyermark, Gardner, *J. Am. Chem. Soc.*, 1930, **52**, 4891.

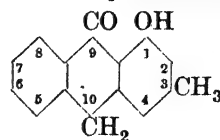
Perkin, Haddock, *J. Chem. Soc.*, 1933, 1519.

4-Hydroxy-2-methylanthrone.

Light brown needles from C₆H₆-pet. ether. M.p. 258-9°.

See first reference above.

1-Hydroxy-3-methylanthrone



C₁₅H₁₂O₂

MW, 224

Yellow needles from C₆H₆-pet. ether. M.p. 158-9°.

Steyermark, Gardner, *J. Amer. Chem. Soc.*, 1930, **52**, 4891.

2-Hydroxy-3-methylanthrone.

Prisms from AcOH. M.p. 276-7°. Spar. sol. EtOH, Me₂CO, CHCl₃, xylene.

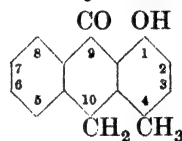
Bistrzycki, Zen-Ruffinen, *Helv. Chim. Acta*, 1920, **3**, 374.

4-Hydroxy-3-methylanthrone.

Needles from C₆H₆-pet. ether. M.p. 207-8°.

Steyermark, Gardner, *J. Amer. Chem. Soc.*, 1930, **52**, 4891.

1-Hydroxy-4-methylanthrone



C₁₅H₁₂O₂

MW, 224

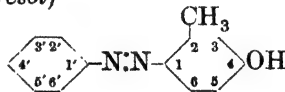
Yellow needles from C₆H₆-pet. ether. M.p. 167-8°.

See previous reference.

2-Hydroxy-4-methylanthrone.

See 2-Hydroxy-4-methylanthranol.

4-Hydroxy-2-methylazobenzene (6-Benzeneazo-m-cresol)



C₁₃H₁₂ON₂

MW, 212

Yellow needles from ligroin. M.p. 109°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆.

B, HCl: m.p. 185°.

Et ether: C₁₅H₁₆ON₂. MW, 240. Orange needles. M.p. 51-2°. Sol. EtOH, Et₂O, ligroin.

Noelting, Kohn, *Ber.*, 1884, **17**, 366.

Jacobson *et al.*, *Ann.*, 1895, **287**, 147.

4'-Hydroxy-2-methylazobenzene (o-Tolueneazo-p-phenol).

Red needles from C₆H₆-ligroin. M.p. 107-8°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. ligroin. Sol. alkalis.

B, HCl: m.p. 141° decomp.

Me ether: o-tolueneazo-p-anisole. $C_{14}H_{14}ON_2$. MW, 226. Brown needles. M.p. 59°.

Et ether: o-tolueneazo-p-phenetole. $C_{15}H_{16}ON_2$. MW, 240. Orange plates. M.p. 53°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O.

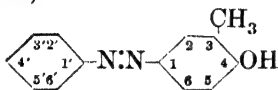
Acetyl: red leaflets. M.p. 68°.

Noelting, Werner, *Ber.*, 1890, 23, 3257.

Grandmougin, Freimann, *J. prakt. Chem.*, 1908, 78, 388.

Farmer, Hantzsch, *Ber.*, 1899, 32, 3097.

4-Hydroxy-3-methylazobenzene (5-Benzeneazo-o-cresol)



$C_{13}H_{12}ON_2$ MW, 212

Yellow needles from EtOH. M.p. 128-30°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆, dil. alkalis. Spar. sol. hot H₂O.

Et ether: $C_{15}H_{16}ON_2$. MW, 240. Orange needles from EtOH. M.p. 60°. Sol. EtOH, Et₂O, C₆H₆.

Acetyl: yellow plates. M.p. 81-2°.

Benzoyl: yellow needles. M.p. 110°.

Liebermann, Kostanecki, *Ber.*, 1884, 17, 877.

Noelting, Kohn, *Ber.*, 1884, 17, 363.

6-Hydroxy-3-methylazobenzene (3-Benzeneazo-p-cresol).

Golden leaflets from C₆H₆. M.p. 108-9°. Sol. EtOH, Et₂O, CHCl₃. Sol. conc. H₂SO₄ to brown sol. Sol. dil. alkalis. Sublimes. Volatile in steam.

Et ether: $C_{15}H_{16}ON_2$. MW, 240. Red leaflets from EtOH. M.p. 48°. Sol. EtOH, Et₂O, C₆H₆.

Acetyl: orange-red needles. M.p. 67-8°. Sol. EtOH, Et₂O, Me₂CO, CHCl₃. Insol. dil. alkalis.

Benzoyl: yellow needles. M.p. 113°.

Liebermann, Kostanecki, *Ber.*, 1884, 17, 131.

Noelting, Kohn, *Ber.*, 1884, 17, 352.

Puxeddu, Maccioni, *Gazz. chim. ital.*, 1907, 37, 82.

Noelting, Werner, *Ber.*, 1890, 23, 3262.

4'-Hydroxy-3-methylazobenzene (m-Tolueneazo-p-phenol).

Dark yellow prisms from C₆H₆-ligroin. M.p. 144-5°.

B, HCl: m.p. 160-72°.

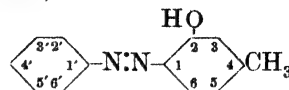
Et ether: m-tolueneazo-p-phenetole. $C_{15}H_{16}ON_2$. MW, 240. Orange-red prisms

from EtOH. M.p. 65°. Sol. EtOH, Et₂O, C₆H₆.

Paganini, *Ber.*, 1891, 24, 368.

Jacobson *et al.*, *Ann.*, 1895, 287, 161.

2-Hydroxy-4-methylazobenzene (4-Benzeneazo-m-cresol)



$C_{13}H_{12}ON_2$ MW, 212

Red needles. M.p. 122°. Sol. EtOH, Me₂CO, CHCl₃, C₆H₆. Spar. sol. alkalis.

McPherson, Boord, *J. Am. Chem. Soc.*, 1911, 33, 1530.

2'-Hydroxy-4-methylazobenzene (p-Tolueneazo-o-phenol).

Yellow plates from EtOH. M.p. 100°. Sol. most org. solvents. Volatile in steam.

Et ether: p-tolueneazo-o-phenetole. $C_{15}H_{16}ON_2$. MW, 240. Red prisms from ligroin. M.p. 92-3°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. pet. ether.

Bamberger, *Ber.*, 1900, 33, 3191.

Jacobson, Huber, *Ann.*, 1909, 369, 7.

4'-Hydroxy-4-methylazobenzene (p-Tolueneazo-p-phenol).

Orange-red prisms. M.p. 152°. Sol. EtOH, Et₂O, C₆H₆, alkalis. Spar. sol. H₂O.

B, HCl: m.p. 176° decomp.

B, 2HNO₃: m.p. 54°.

Me ether: p-tolueneazo-p-anisole. $C_{14}H_{14}ON_2$. MW, 226. Red prisms from EtOH. M.p. 110-11°. Sol. most org. solvents.

Et ether: p-tolueneazo-p-phenetole. $C_{15}H_{16}ON_2$. MW, 240. Red leaflets from EtOH. M.p. 121-2°. B.p. 251°/47 mm. Sol. EtOH, CHCl₃.

Acetyl: orange needles from C₆H₆. M.p. 98°. *Benzoyl*: orange-red prisms from C₆H₆. M.p. 178°.

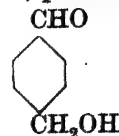
Grandmougin, Freimann, *J. prakt. Chem.*, 1908, 78, 392.

McPherson, Stratton, *J. Am. Chem. Soc.*, 1915, 37, 911.

Jacobson *et al.*, *Ann.*, 1895, 287, 162.

Hantzsch, Glover, *Ber.*, 1906, 39, 4163.

p-Hydroxymethyl-benzaldehyde (ω-Hydroxy-p-toluic aldehyde, p-aldehydobenzyl alcohol)



$C_8H_8O_2$

MW, 136

Oil. B.p. above 200°.

Me ether: $C_9H_{10}O_2$. MW, 150. B.p. 125°/16 mm. D_{25}^{25} 1.071. n_D^{25} 1.535. *Semicarbazone*: cryst. from EtOH. M.p. 182°.

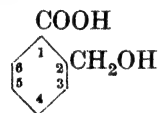
Et ether: $C_{10}H_{12}O_2$. MW, 164. Oil. B.p. 133-4°/14 mm. *Phenylhydrazone*: cryst. M.p. 86°.

Allain-Le Canu, *Compt. rend.*, 1894, **118**, 535.

Quelet, *Compt. rend.*, 1931, **193**, 939; *Bull. soc. chim.*, 1933, **53**, 230.

Sabeta, *Compt. rend.*, 1931, **193**, 1194.

o-Hydroxymethyl-benzoic Acid (ω -Hydroxy-o-toluic acid, benzyl alcohol 2-carboxylic acid, 2-carboxyphenylethyl alcohol)



$C_8H_8O_3$ MW, 152

Needles. M.p. 128° (118-20°). Sol. H_2O , EtOH, Et_2O . Heat of comb. C_p 887.8 Cal. $k = 1.51 \times 10^{-4}$ at 25°.

Me ether: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. 93-4°. B.p. 121-5°/0.5 mm. *Me ester*: $C_{10}H_{12}O_3$. MW, 180. B.p. 124-5°/15 mm.

Et ether: $C_{10}H_{12}O_3$. MW, 180. *Nitrile*: $C_{10}H_{11}ON$. MW, 161. B.p. 242°.

Phenyl ether: $C_{14}H_{12}O_3$. MW, 228. Needles from EtOH. M.p. 126°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O . *Me ester*: $C_{15}H_{14}O_3$. MW, 242. Needles from EtOH. M.p. 52-5°. B.p. 204°/13 mm. *Nitrile*: $C_{14}H_{11}ON$. MW, 209. Needles from ligroin. M.p. 63-5°.

Hydrazide: needles from EtOH. M.p. 128°.

Lactone: see Phthalide.

Cassirer, *Ber.*, 1892, **25**, 3019.

Zincke, Fries, *Ann.*, 1904, **334**, 359.

Staudinger, Mächling, *Ber.*, 1916, **49**, 1976.

v. Braun, Anton, Weissbach, *Ber.*, 1930, **63**, 2861.

m-Hydroxymethyl-benzoic Acid (ω -Hydroxy-m-toluic acid, benzyl alcohol 3-carboxylic acid, 3-carboxyphenylethyl alcohol).

Cryst. powder. M.p. 111°. B.p. 190°/11 mm.

Nitrile: 3-cyanobenzyl alcohol. C_8H_7ON . MW, 133. B.p. 165°/16 mm.

Langgruth, *Ber.*, 1905, **38**, 2063.

p-Hydroxymethyl-benzoic Acid (ω -Hydroxy-p-toluic acid, benzyl alcohol 4-carboxylic acid, 4-carboxyphenylethyl alcohol).

Diet. of Org. Comp.—II.

Plates or needles from H_2O . M.p. 181°. Sol. Et_2O . Sublimes in needles.

Et ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 161-3°/5 mm. *Benzoyl*: oil. B.p. 203-7°/3 mm. *p-Nitrobenzoyl*: yellow cryst. from EtOH. M.p. 86°. *p-Aminobenzoyl*: cryst. from C_6H_6 -pet. ether. M.p. 95°. Sol. EtOH. Insol. H_2O . *Urethane*: cryst. from C_6H_6 -pet. ether. M.p. 119°. Sol. EtOH. Insol. H_2O . *Phenylurethane*: cryst. from C_6H_6 -pet. ether. M.p. 107°. Sol. EtOH. Insol. H_2O .

Propyl ester: $C_{11}H_{14}O_3$. MW, 194. B.p. 164-5°/4 mm.

Butyl ester: $C_{12}H_{16}O_3$. MW, 208. B.p. 174°/3 mm.

Benzyl ester: $C_{15}H_{14}O_3$. MW, 242. Cryst. from Et_2O -pet. ether. M.p. 63°.

Me ether: $C_9H_{10}O_3$. MW, 166. Leaflets from H_2O . M.p. 123°. *Chloride*: $C_9H_9O_2Cl$. MW, 184.5. B.p. 136-8°/8 mm.

Et ether: $C_{10}H_{12}O_3$. MW, 180. Plates from H_2O . M.p. 87° (78-9°). Sol. usual solvents. *Et ester*: $C_{12}H_{16}O_3$. MW, 208. B.p. 277-278.5°, 163-5°/18 mm. *Chloride*: $C_{10}H_{11}O_2Cl$. MW, 198.5. B.p. 136-8°/8 mm. *Amide*: $C_{10}H_{13}O_2N$. MW, 179. Needles from H_2O . M.p. 112°.

Nitrile: 4-cyanobenzyl alcohol. C_8H_7ON . MW, 133. Leaflets from AcOEt. M.p. 133-4°. Sol. H_2O . Insol. C_6H_6 , $CHCl_3$, ligroin. *Acetyl*: m.p. 71-2°. *Benzoyl*: m.p. 123°.

Einhorn, Ladisch, *Ann.*, 1900, **310**, 203.

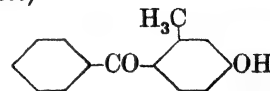
Friedländer, Moszczyc, *Ber.*, 1895, **28**, 1144.

Salkind, *J. Russ. Phys.-Chem. Soc.*, 1914, **46**, 509.

Case, *J. Am. Chem. Soc.*, 1925, **47**, 1144, 3004.

Quelet, *Bull. soc. chim.*, 1933, **53**, 234.

4-Hydroxy-2-methylbenzophenone (5-Benzo-m-cresol)

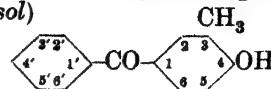


$C_{14}H_{12}O_2$ MW, 212

Colourless cryst. from C_6H_6 -pet. ether. M.p. 129°. Non-volatile in steam.

Hamada, *Chem. Abstracts*, 1933, **27**, 3928.

4-Hydroxy-3-methylbenzophenone (5-Benzo-o-cresol)



$C_{14}H_{12}O_2$ MW, 212

Yellow cryst. from C_6H_6 . M.p. 172–3°. Non-volatile in steam.

See above reference.

6-Hydroxy-3-methylbenzophenone (3-*Benzo-p-cresol*).

Yellow cryst. from EtOH. M.p. 83–4°. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 , to yellow sols. Colourless sol. in ligroin.

Et ether: $C_{16}H_{16}O_2$. MW, 240. Pale yellow needles from EtOH. M.p. 68°.

Acetyl: m.p. 102–3°.

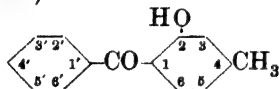
Oxime: needles from AcOH. M.p. 126–9°.

Azine: yellow cryst. from AcOH. M.p. 260°.

Auwers, Betteridge, *Ber.*, 1903, 36, 3891.

Auwers, Czerny, *Ber.*, 1898, 31, 2694.

2-Hydroxy-4-methylbenzophenone (4-*Benzo-m-cresol*)



$C_{14}H_{12}O_2$ MW, 212

Yellow cryst. from EtOH.Aq. M.p. 60°. $FeCl_3 \rightarrow$ blood-red col.

Hamada, *Chem. Abstracts*, 1933, 27, 3928.

2'-Hydroxy-4-methylbenzophenone (2-*p-Toluyphenol*).

Cryst. from EtOH.Aq. M.p. 61.5°. Sol. EtOH, C_6H_6 . Spar. sol. H_2O , ligroin. Ox. \rightarrow terephthalic acid.

Oxime: m.p. 175°.

Benzoyl: cryst. from EtOH. M.p. 80°.

Phenylhydrazone: yellow cryst. from C_6H_6 . M.p. 145°.

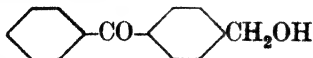
Ullmann, Goldberg, *Ber.*, 1902, 35, 2812.

4'-Hydroxy-4-methylbenzophenone (4-*p-Toluyphenol*).

Needles from H_2O . M.p. 160°. Spar. sol. CS_2 .

Limpricht, Samietz, *Ann.*, 1895, 286, 328.

4-Hydroxymethyl-benzophenone (p-*Benzoylbenzyl alcohol*, *phenyl ω-hydroxy-p-tolyl ketone*)



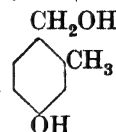
$C_{14}H_{12}O_2$ MW, 212

Leaflets from H_2O . M.p. 48.3°. Sol. EtOH, Et_2O , $CHCl_3$, Me_2CO . Spar. sol. H_2O .

Acetyl: needles from Et_2O . M.p. 36°.

Bourcet, *Bull. soc. chim.*, 1896, 15, 947.

4-Hydroxy-2-methylbenzyl Alcohol (1-*ω-Hydroxy-o-4-xyleneol*)

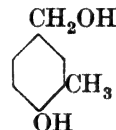


$C_8H_{10}O_2$ MW, 138

Cryst. from AcOEt. M.p. 122°. $FeCl_3$ on EtOH sol. \rightarrow green col.

Bayer, D.R.P., 85,588.

4-Hydroxy-3-methylbenzyl Alcohol (1-*ω-Hydroxy-m-4-xyleneol*)



$C_8H_{10}O_2$ MW, 138

Cryst. from $CHCl_3$. M.p. 87°.

See above reference.

2-Hydroxy-4-methylbenzyl Alcohol.

See 4-Methylsaligenin.

2-Hydroxy-5-methylbenzyl Alcohol.

See Homosaligenin.

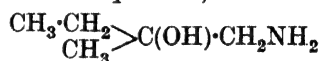
α-Hydroxy-N-methylbenzylamine.

See α-Methylaminobenzyl Alcohol.

Hydroxy-methylbutenyl-α-naphtho-quinone.

See Lapachol and Isolapachol.

2-Hydroxy-2-methyl-n-butylamine (2-*Hydroxy-1-aminoisopentane*)



$C_5H_{13}ON$ MW, 103

B.p. 170°, 75–80°/30 mm. Misc. with H_2O , Et_2O .

B,HCl: leaflets from Me_2CO . M.p. 90°.

Fourneau, *J. pharm. chim.*, 1910, 2, 56, (*Chem. Zentr.*, 1910, II, 1386).

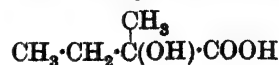
α-Hydroxy-α-methylbutylbenzene.

See Methyl-ethylbenzylcarbinol.

Hydroxymethyl butyl Ketone.

See 1-Hexanolone-2.

1-Hydroxy-1-methylbutyric Acid (*Methyl-ethylglycollic acid*, *1-ethyl-lactic acid*)



$C_5H_{10}O_3$ MW, 118

Cryst. M.p. 72–3° (68°). B.p. 133–4°/16 mm. Very sol. EtOH, H_2O , Et_2O . Sublimes

in needles at 90°. $\text{CrO}_3 \rightarrow$ methyl ethyl ketone.

Me ester: $\text{C}_6\text{H}_{12}\text{O}_3$. MW, 132. B.p. 151-6-152°.

Et ester: $\text{C}_7\text{H}_{14}\text{O}_3$. MW, 146. B.p. 165.5° (162°). D^{13}_D 0.9768. Very sol. H_2O , EtOH, Et_2O .

Amide: $\text{C}_5\text{H}_{11}\text{O}_2\text{N}$. MW, 117. Cryst. M.p. 160°.

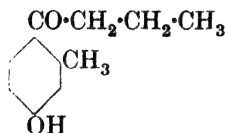
Nitrile: methyl ethyl ketone cyanhydrin. $\text{C}_5\text{H}_9\text{ON}$. MW, 99. B.p. 180°/762 mm., 91°/20.5 mm. Sol. H_2O , EtOH, Et_2O . D^{24}_D 0.9212 (D^{19}_D 0.9303). *Acetyl*: b.p. 195°/764 mm. Sol. EtOH, Et_2O . Insol. H_2O . D^{24}_D 0.9629.

Meerwein, *Ann.*, 1913, 396, 255.

Henry, *Chem. Zentr.*, 1899, I, 194.

Fischer, Grävenitz, *Ann.*, 1914, 406, 10.

4-Hydroxy-2-methylbutyrophenone (6-*Butyryl-m-cresol*, *propyl 5-hydroxy-o-tolyl ketone*)

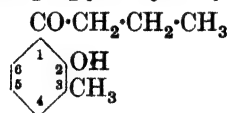


$\text{C}_{11}\text{H}_{14}\text{O}_2$ MW, 178

Plates from C_6H_6 . M.p. 97-8°.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 288.

2-Hydroxy-3-methylbutyrophenone (3-*Butyryl-o-cresol*, *propyl 2-hydroxy-m-tolyl ketone*)



$\text{C}_{11}\text{H}_{14}\text{O}_2$ MW, 178

B.p. 143°/11 mm.

Oxime: needles from EtOH. M.p. 87-8°.

Phenylhydrazone: yellow needles from EtOH. M.p. 157-8°.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 286.

4-Hydroxy-3-methylbutyrophenone (5-*Butyryl-o-cresol*, *propyl 6-hydroxy-m-tolyl ketone*). Prisms from C_6H_6 . M.p. 132-3°. B.p. 195-200°/15 mm.

Phenylhydrazone: yellow plates from EtOH. M.p. 110°.

See above reference.

6-Hydroxy-3-methylbutyrophenone (3-*Butyryl-p-cresol*, *propyl 4-hydroxy-m-tolyl ketone*). Prisms from MeOH. M.p. 33-4°. B.p. 132-

3°/15 mm. $D^{56.5}_D$ 1.0188. $n^{56.2}_D$ 1.51778. $\text{FeCl}_3 \rightarrow$ bluish-violet col. Na salt spar. sol. alkalis.

Oxime: needles from pet. ether. M.p. 96-7°.

Semicarbazone: needles from EtOH. M.p. 188-9°.

Phenylhydrazone: prisms from EtOH. M.p. 141-2°.

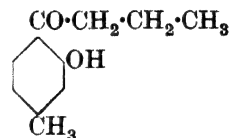
p-Nitrophenylhydrazone: red prisms from EtOH. M.p. 184-6°.

Auwers, Lammerhirt, *Ber.*, 1920, 53, 437.

Auwers, Meissner, *Ann.*, 1924, 439, 146.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 287.

2-Hydroxy-4-methylbutyrophenone 4-*Butyryl-m-cresol*, *propyl 3-hydroxy-p-tolyl ketone*



$\text{C}_{11}\text{H}_{14}\text{O}_2$

MW, 178

M.p. 17°. B.p. 142-4°/15 mm.

Oxime: needles from pet. ether. M.p. 74-5°.

Phenylhydrazone: yellowish leaflets from EtOH. M.p. 95-7°.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 288.

2-Hydroxy-2-methylcamphane.

See Homoborneol.

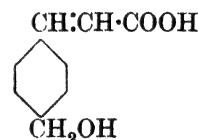
2-Hydroxy-3-methylcinchoninic Acid.

See 2-Hydroxy-3-methylquinoline-4-carboxylic Acid.

Hydroxy-methylcinnamic Acid.

See Methylcoumaric Acid and Methylcoumarinic Acid.

4-Hydroxymethyl-cinnamic Acid



$\text{C}_{10}\text{H}_{10}\text{O}_3$

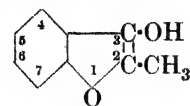
MW, 178

Needles from Me_2CO . M.p. 200-1°. Sol. EtOH, Me_2CO . Spar. sol. H_2O , C_6H_6 , CHCl_3 . Insol. ligroin.

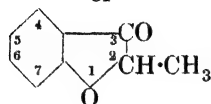
Einhorn, Göttler, *Ber.*, 1909, 42, 4845.

Hydroxymethylcoumarin.

See Homoumbelliferone and 4-Methylumbelliferone.

3 - Hydroxy - 2 - methylcoumarone (*Enol form of 2-methylcoumaranone*)

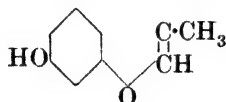
or

 $C_9H_8O_2$

MW, 148

Oil. B.p. 163–5°/40 mm., 119°/15 mm. D_4^{20} 1.153. n_D^{20} 1.5631. Reduces Fehling's and $NH_3 \cdot AgNO_3$.

Stoermer, Atenstädt, *Ber.*, 1902, **35**, 3565.
Auwers, *Ber.*, 1919, **52**, 121.

6-Hydroxy-3-methylcoumarone $C_9H_8O_2$

MW, 148

Needles from H_2O . M.p. 103° (97°). Sol. EtOH, Et_2O . Mod. sol. H_2O . Sol. alkalis with blue fluor. Alc. $FeCl_3 \rightarrow$ bluish-red col. Volatile in steam. Sublimes.

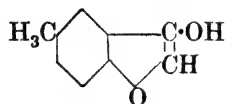
Me ether: $C_{10}H_{10}O_2$. MW, 162. Plates. M.p. 58°. B.p. 246°/105 mm. Volatile in steam. Conc. $H_2SO_4 \rightarrow$ violet col.

Et ether: $C_{11}H_{12}O_2$. MW, 176. Plates from EtOH.Aq. M.p. 51–2°. Volatile in steam.

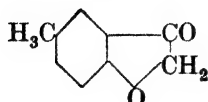
Hantzsch, *Ber.*, 1886, **19**, 2929.

v. Pechmann, Hanke, *Ber.*, 1901, **34**, 361.

Kostanecki, Tambor, *Ber.*, 1909, **42**, 905.

3 - Hydroxy - 5 - methylcoumarone (*Enol form of 5-methylcoumaranone*)

or

 $C_9H_8O_2$

MW, 148

Needles from pet. ether. M.p. 54° (51–2°). Sol. EtOH, Et_2O , C_6H_6 , AcOH. Spar. sol. pet. ether. Aq. sol. shows blue fluor. D_4^{20} 1.1506. n_D^{20} 1.56521. Reduces Fehling's and $NH_3 \cdot AgNO_3$.

Me ether: b.p. 149°/36 mm.

Et ether: b.p. 133°/15.5 mm.

Oxime: m.p. 144°.

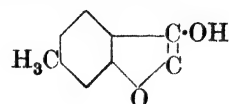
Semicarbazone: m.p. 231°.

Stoermer, Bartsch, *Ber.*, 1900, **33**, 3181.

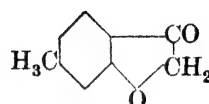
Auwers, *Ber.*, 1919, **52**, 121.

Auwers, Auffenberg, *Ber.*, 1919, **52**, 94.

Higginbottom, Stephen, *J. Chem. Soc.*, 1920, **117**, 1541.

3-Hydroxy-6-methylcoumarone (*Enol form of 6-methylcoumaranone*)

or

 $C_9H_8O_2$

MW, 148

Yellow needles from EtOH. M.p. 85°. Sol. EtOH, AcOH. Volatile in steam.

Oxime: m.p. 156° (165°).

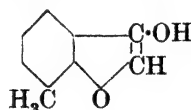
Semicarbazone: m.p. 208°.

Stoermer, Bartsch, *Ber.*, 1900, **33**, 3180.

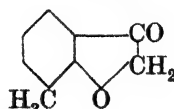
Fries, Finck, *Ber.*, 1908, **41**, 4279.

Auwers, Auffenberg, *Ber.*, 1919, **52**, 94.

Higginbottom, Stephen, *J. Chem. Soc.*, 1920, **117**, 1541.

3 - Hydroxy - 7 - methylcoumarone (*Enol form of 7-methylcoumaranone*)

or

 $C_9H_8O_2$

MW, 148

Yellow cryst. M.p. 88° (102°). Sol. H_2O and usual org. solvents. Volatile in steam.

Oxime: m.p. 148°.

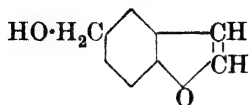
Semicarbazone: m.p. 237°.

Stoermer, Bartsch, *Ber.*, 1900, **33**, 3179.

Auwers, Auffenberg, *Ber.*, 1919, **52**, 94.

Higginbottom, Stephen, *J. Chem. Soc.*, 1920, **117**, 1542.

5-Hydroxymethylcoumarone

 $C_9H_8O_2$

MW, 148

Cryst. M.p. 26–7°. B.p. about 147–50°/12 mm.

Stoermer, Oetker, *Ber.*, 1904, **37**, 200.

Hydroxy-methylcyclohexylacetic Acid.

See Methylcyclohexanol-acetic Acid.

Hydroxy-methylcyclopentylacetic Acid.

See Methylcyclopentanol-acetic Acid.

 α -Hydroxymethyl-dibenzyl.

See 3-Hydroxy-1 : 2-diphenylpropane.

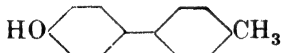
 α -Hydroxy- α -methyldibenzyl.

See 2-Hydroxy-1 : 2-diphenylpropane.

 β -Hydroxy- α -methyldibenzyl.

See 1-Hydroxy-1 : 2-diphenylpropane.

4'-Hydroxy-4-methyldiphenyl (4-p-Tolylphenol)

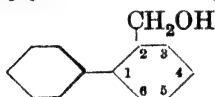
 $C_{13}H_{12}O$

MW, 184

Cryst. M.p. 155°. B.p. 330°.

Hirsch, D.R.P., 58,001.

2-Hydroxymethyldiphenyl (o-Phenylbenzyl alcohol, o-diphenylcarbinol, o-xenylcarbinol)

 $C_{13}H_{12}O$

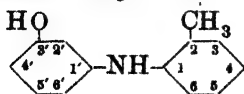
MW, 184

Oil. B.p. 181°/8 mm. Sol. EtOH, Et₂O, C₆H₆. Insol. H₂O.Acetyl: oil. B.p. 182°/20 mm. Sol. EtOH, Et₂O. Insol. H₂O.Fanto, *Monatsh.*, 1898, **19**, 591.

3-Hydroxymethyldiphenyl (m-Phenylbenzyl alcohol, m-diphenylcarbinol, m-xenylcarbinol).

Liq. Slowly solidifies. Sol. EtOH, Et₂O, CHCl₃, CS₂. Spar. sol. ligroin.Me ether: C₁₄H₁₄O. MW, 198. Liq. Volatile in steam.Et ether: C₁₅H₁₆O. MW, 212. Liq. Sol. Et₂O. Volatile in steam.Adam, *Ann. chim. phys.*, 1888, **15**, 243.

3'-Hydroxy-2-methyldiphenylamine (3-o-Toluidinophenol, o-tolyl-m-aminophenol)

 $C_{13}H_{13}ON$

MW, 199

Oil. B.p. 370–5°. Sol. EtOH, Et₂O, C₆H₆, AcOH. Zn dust dist. → 2-methyldiphenylamine.Me ether: o-tolyl-m-anisidine. C₁₄H₁₅ON. MW, 213. Oil.Et ether: o-tolyl-m-phenetidine. C₁₅H₁₇ON. MW, 227. Oil.

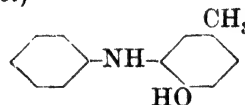
Badische, D.R.Ps, 46,869, 63,260.

Philip, *J. prakt. Chem.*, 1886, **34**, 70.

4'-Hydroxy-2-methyldiphenylamine (4-o-Toluidinophenol, o-tolyl-p-aminophenol).

Plates from C₆H₆-pet. ether. M.p. 90°. B.p. 366–8°. Sol. EtOH, Et₂O. Spar. sol. pet. ether. Zn dust dist. → acridine. Hot HCl → o-toluidine + hydroquinone.Et ether: o-tolyl-p-phenetidine. C₁₅H₁₇ON. MW, 227. Cryst. from ligroin. M.p. 81–2°. B.p. 354°.Philip, *J. prakt. Chem.*, 1886, **34**, 57.Jacobson, Henrich, *Ann.*, 1895, **287**, 175.

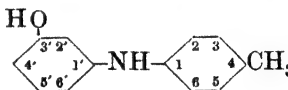
5-Hydroxy-3-methyldiphenylamine (3-Anilino-p-cresol)

 $C_{13}H_{13}ON$

MW, 199

Needles from EtOH. M.p. 79°. B.p. 345°. Sol. EtOH, Et₂O, Me₂CO, C₆H₆. Spar. sol. pet. ether. Zn dust dist. → 3-methyldiphenylamine.Zega, Buch, *J. prakt. Chem.*, 1886, **33**, 539.

3'-Hydroxy-4-methyldiphenylamine (3-p-Toluidinophenol, p-tolyl-m-aminophenol)

 $C_{13}H_{13}ON$

MW, 199

Needles or prisms from C₆H₆-pet. ether. M.p. 92°. B.p. 350°. Sol. EtOH, Et₂O, Me₂CO, C₆H₆. Spar. sol. hot H₂O, pet. ether. Zn dust dist. → 4-methyldiphenylamine.

N-Acetyl: m.p. 213°.

Me ether: p-tolyl-m-anisidine. C₁₄H₁₅ON. MW, 213. Cryst. from C₆H₆. B.p. about 360°.Et ether: p-tolyl-m-phenetidine. C₁₅H₁₇ON. MW, 227. Cryst. M.p. about 30°. N-Acetyl: m.p. 61°.

Badische, D.R.Ps, 46,869, 62,539.

Hatschek, Zega, *J. prakt. Chem.*, 1886, **33**, 209.Gnehm, Veillon, *J. prakt. Chem.*, 1902, **65**, 49.

4'-Hydroxy-4-methyldiphenylamine (4-p-Toluidinophenol, p-tolyl-p-aminophenol).

Plates from C_6H_6 . M.p. 122° . B.p. $350-60^\circ$. Sol. EtOH, C_6H_6 . Zn dust dist. \rightarrow 4-methyldiphenylamine. $FeCl_3 \rightarrow$ green col. \rightarrow brownish red with excess $FeCl_3$.

O : N-Diacetyl : m.p. 101° .

O : N-Dibenzoyl : m.p. 169° .

Hatschek, Zega, *J. prakt. Chem.*, 1886, 33, 224.

Bamberger, *Ann.*, 1912, 390, 189.

Heller, *Ann.*, 1919, 418, 264.

α -Hydroxy-methyldiphenylmethane.

See Methylbenzhydrol.

Hydroxymethylene-acetophenone.

See ω -Formylacetophenone.

Hydroxymethylene-butyrophenone.

See β -Formylbutyrophenone.

Hydroxymethylene-malonic Acid.

See Formylmalonic Acid.

β -Hydroxymethylene-propiophenone.

See β -Formylpropiophenone.

Hydroxymethylene-succinic Acid.

See Formylsuccinic Acid.

Hydroxymethyl-ethylbenzene.

See Ethylbenzyl Alcohol.

Hydroxymethylethylene oxide.

See Glycide.

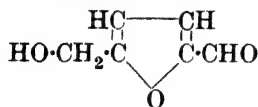
2-Hydroxymethyl-1-ethylglutaric Acid.

See Homopilomalic Acid.

2-Hydroxymethylfuran.

See Furfuryl Alcohol.

5-Hydroxymethylfurfural



$C_6H_6O_3$

MW, 126

Needles. M.p. $35-35.5^\circ$. B.p. $114-16^\circ$, $72^\circ/0.002$ mm. n_D^{15} 1.5105. Sol. H_2O , EtOH, AcOEt. Spar. sol. Et_2O . Volatile in steam. Reduces Fehling's. Conc. HCl \rightarrow red col. Dil. acids \rightarrow levulinic + formic acids. Hydr. azine \rightarrow 5-methylfurfuryl alcohol.

Oxime : syn-, m.p. $77-8^\circ$; anti-, m.p. 108° .

Semicarbazone : m.p. $166-7^\circ$.

Phenylhydrazone : m.p. 140° .

p-Nitrophenylhydrazone : m.p. 185° .

Teunissen, *Rec. trav. chim.*, 1930, 49, 784.

Reichstein, Zschokke, *Helv. Chim. Acta*, 1932, 15, 250.

4-Hydroxymethyl-glyoxaline.

See 4-Iminazolylo-carbinol.

6-Hydroxy-4-methylhemimellitic Acid.

See Cochenillic Acid.

Hydroxy-methyl-hydrocinnamic Acid.

See Hydroxy-phenyl-butyric Acid and Hydroxy-phenyl-isobutyric Acid.

Hydroxymethyl-indene.

See Indenylcarbinol.

3-Hydroxy-2-methylindole.

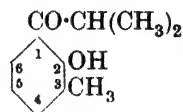
See 2-Methylindoxyl.

Hydroxymethyl-indole.

See Indolylcarbinol.

2-Hydroxy-3-methylisobutyrophenone

(3-Isobutyryl-o-cresol, isopropyl 2-hydroxy-m-tolyl ketone)



$C_{11}H_{14}O_2$

MW, 178

Greenish-yellow oil. D_4^{20} 1.047. n_D^{20} 1.5368. $FeCl_3 \rightarrow$ violet col.

Acetyl : oil. B.p. $152-4^\circ/12$ mm. D_4^{20} 1.074. n_D^{20} 1.5136.

Auwers, Baum, Lorenz, *J. prakt. Chem.*, 1927, 115, 94.

4-Hydroxy-3-methylisobutyrophenone

(5-Isobutyryl-o-cresol, isopropyl 6-hydroxy-m-tolyl ketone).

Plates from C_6H_6 . M.p. 122° . B.p. $182^\circ/12$ mm. Sol. EtOH, Et_2O . Spar. sol. hot H_2O . No col. with $FeCl_3$.

See above reference.

6-Hydroxy-3-methylisobutyrophenone

(3-Isobutyryl-p-cresol, isopropyl 4-hydroxy-m-tolyl ketone).

B.p. $250.5-251.5^\circ/763$ mm., $125-125.3^\circ/11$ mm. $D_4^{18.6}$ 1.0460. $n_D^{18.6}$ 1.538. $FeCl_3 \rightarrow$ violet col.

Me ether : $C_{12}H_{16}O_2$. MW, 192. B.p. $136-137.5^\circ/10$ mm., $155^\circ/25$ mm. $D_4^{14.2}$ 1.0213. $n_D^{13.7}$ 1.521.

Oxime : cryst. from MeOH.Aq. or C_6H_6 . M.p. $149-50^\circ$.

Phenylhydrazone : plates from C_6H_6 -pet. ether. M.p. $126.5-127.5^\circ$. Sol. EtOH, AcOH. Spar. sol. Et_2O , C_6H_6 .

Semicarbazone : needles from AcOEt. M.p. $193-4^\circ$.

Auwers, *Ann.*, 1915, 408, 251.

Auwers, Baum, Lorenz, *J. prakt. Chem.*, 1927, 115, 98.

2-Hydroxy-4-methylisobutyrophenone

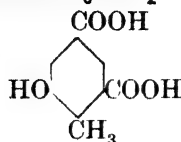
(4-Isobutyryl-m-cresol, isopropyl 3-hydroxy-p-tolyl ketone).

5-Hydroxy-4-methylisophthalic Acid

295

B.p. 120–1°/11 mm. D_4^{20} 1.042. n_D^{20} 1.5401.
 $\text{FeCl}_3 \rightarrow$ violet col.

Auwers, Koch, *Ann.*, 1924, **439**, 166.

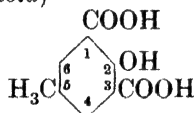
5-Hydroxy-4-methylisophthalic Acid

$\text{C}_9\text{H}_8\text{O}_5$ MW, 196
 Needles from H_2O . M.p. 270° decomp. No
 col. with FeCl_3 .

Jacobsen, *Ber.*, 1881, **14**, 2114.

6-Hydroxy-4-methylisophthalic Acid.

See α -Coccinic Acid.

2-Hydroxy-5-methylisophthalic Acid (2-Hydroxyuvitic acid)

$\text{C}_9\text{H}_8\text{O}_5$ MW, 196
 Needles from H_2O . M.p. 235° decomp. Sol.
 EtOH , Et_2O . Mod. sol. CHCl_3 . Spar. sol. H_2O .
 Insol. C_6H_6 , pet. ether. $\text{FeCl}_3 \rightarrow$ intense red
 col.

Me ether: $\text{C}_{10}\text{H}_{10}\text{O}_5$. MW, 210. Cryst.
 from C_6H_6 . M.p. 180°. Sol. hot H_2O , Et_2O ,
 EtOH , AcOH . Spar. sol. C_6H_6 , ligroin. Warm
 $\text{KMnO}_4 \rightarrow$ methoxytrimesic acid.

Di-Me ester: $\text{C}_{11}\text{H}_{12}\text{O}_5$. MW, 224. Needles
 from EtOH . M.p. 79°. Insol. H_2O . Volatile
 in steam.

Jacobsen, *Ann.*, 1879, **195**, 274, 285;
 1881, **206**, 201.

Ullmann, Brittner, *Ber.*, 1909, **42**, 2542.

4-Hydroxy-5-methylisophthalic Acid (4-Hydroxyuvitic acid).

Needles from EtOH . M.p. 294–5° decomp.
 Sol. EtOH , Et_2O . Spar. sol. H_2O . Insol.
 C_6H_6 , CHCl_3 , pet. ether. $\text{FeCl}_3 \rightarrow$ red col.

Di-Me ester: needles from MeOH . M.p.
 132° (129–30°). Volatile in steam.

Di-Et ester: $\text{C}_{13}\text{H}_{16}\text{O}_5$. MW, 252. Needles
 from ligroin. M.p. 62°.

Dichloride: $\text{C}_9\text{H}_6\text{O}_3\text{Cl}_2$. MW, 233. Needles
 from C_6H_6 . M.p. 67–8°.

Jacobsen, *Ann.*, 1881, **206**, 188.

Böttinger, *Ber.*, 1880, **13**, 1934.

Anschütz, Robitsek, *Ann.*, 1906, **346**, 358.

Zeltner, Landau, D.R.P., 258,887, (*Chem.*
Zentr., 1913, I, 1641).

Hydroxymethylisopropylbenzene.

See Carvacrol, Thymol, and Isopropylcresol.

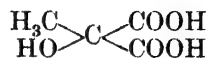
2-Hydroxymethyl-pentane-1 : 3-dicarboxylic Acid**Hydroxy-1-methylisovaleric Acid.**

See Hydroxy-1 : 2-dimethylbutyric Acid.

2-Hydroxymethyl-isovaleric Acid.

See 3-Hydroxy-2 : 2-dimethylbutyric Acid.

Hydroxy-methylmalonic Acid (*Isomalic acid*, *methyltartronic acid*, α -hydroxyisosuccinic acid)



$\text{C}_4\text{H}_6\text{O}_5$ MW, 134

Cryst. M.p. 142° decomp. Sol. H_2O , EtOH ,
 Et_2O . Heat at 170° \rightarrow lactic acid.

Et ether: $\text{C}_6\text{H}_{10}\text{O}_5$. MW, 162. Needles from
 H_2O or Et_2O . M.p. 110–12°. *Di-Me ester*:
 b.p. 110°/16 mm.

Dinitrile: 1 : 1-dicyanoethyl alcohol.
 $\text{C}_4\text{H}_4\text{ON}_2$. MW, 96. *Acetate*: m.p. 69°. B.p.
 210°.

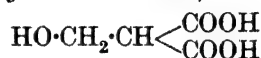
Diamide: $\text{C}_4\text{H}_8\text{O}_3\text{N}_2$. MW, 132. Cryst.
 M.p. 203.5°. Spar. sol. H_2O , EtOH , Et_2O .
Acetate: m.p. 192°.

Tanatar, *Ann.*, 1893, **273**, 41.

Denis, *J. Am. Chem. Soc.*, 1908, **38**, 589.

Bardroff, *Monatsh.*, 1912, **33**, 861.

Hydroxymethyl-malonic Acid (β -*Isomalic acid*, β -hydroxyisosuccinic acid)



$\text{C}_4\text{H}_6\text{O}_5$ MW, 134

Syrup. Heat above 113° \rightarrow acrylic acid.

Cu salt: blue powder from EtOH . Aq.

Ca salt: white amorph. powder. Sol. cold
 H_2O . Insol. boiling H_2O , EtOH .

Me ether: $\text{C}_5\text{H}_8\text{O}_5$. MW, 148. *Di-Et ester*:
 $\text{C}_9\text{H}_{16}\text{O}_5$. MW, 204. Oil. B.p. 121–2°/15 mm.

Et ether: $\text{C}_6\text{H}_{10}\text{O}_5$. MW, 162. Syrup. Sol.
 H_2O .

Tanatar, *Ann.*, 1893, **273**, 45.

Coops, *Rec. trav. chim.*, 1904, **23**, 355.

Simonsen, *J. Chem. Soc.*, 1908, **93**, 1780.

Hydroxy-methylnaphthalene.

See Methylnaphthol.

Hydroxymethyl-naphthalene.

See Naphthylcarbinol.

3-Hydroxy-2-methyl-1 : 4-naphtho-quinone.

See Phthiocol.

3-Hydroxy-2-methyloctane.

See Isopropyl-*n*-amylcarbinol.

1-Hydroxymethyl-pelargonic Acid.

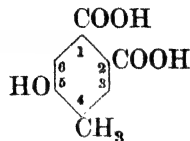
See 1-*n*-Heptylhydracrylic Acid.

2-Hydroxymethyl-pentane-1 : 3-dicarboxylic Acid.

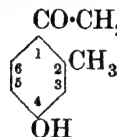
See Homopilomalic Acid.

5-Hydroxy-2-methyl-5-phenylpentane.

See Isoamylphenylcarbinol.

5-Hydroxy-3-methylphthalic Acid.See β -Coccinic Acid.**5-Hydroxy-4-methylphthalic Acid (4-Hydroxy-5-methylphthalic acid)** $C_9H_8O_5$

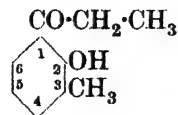
MW, 196

Cryst. from H_2O . M.p. 244–5°.Ba salt: insol. H_2O .Meldrum, Kapadia, *J. Indian Chem. Soc.*, 1932, 9, 490.**6-Hydroxy-4-methylphthalic Acid (3-Hydroxy-5-methylphthalic Acid).**See γ -Coccinic Acid.**4-Hydroxy-2-methylpropioiphenone (6-Propionyl-m-cresol, ethyl 5-hydroxy-o-tolyl ketone)** $C_{10}H_{12}O_2$

MW, 164

Needles from pet. ether. M.p. 114–15°. Sol. EtOH, Me_2CO , AcOH. Mod. sol. C_6H_6 . Spar. sol. pet. ether. No col. with $FeCl_3$.*Me ether*: $C_{11}H_{14}O_2$. MW, 178. Cryst. from EtOH. M.p. 43°. B.p. 149–50°/14 mm. *Oxime*: cryst. from EtOH.Aq. M.p. 94–5°.*Phenylhydrazone*: plates from EtOH. M.p. 152.5–153.5°. Spar. sol. pet. ether.Klages, *Ber.*, 1904, 37, 3993.Auwers, Koch, *Ann.*, 1924, 439, 174.Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1684.**6-Hydroxy-2-methylpropioiphenone (2-Propionyl-m-cresol, ethyl 3-hydroxy-m-tolyl ketone).**Prisms from Et_2O . M.p. 28.5° (25–7°). B.p. 140°/5 mm. Sol. H_2O . $FeCl_3 \rightarrow$ brownish-violet col.*Me ether*: m.p. about 8°. B.p. 137°/16 mm. *Semicarbazone*: needles from C_6H_6 -ligroin. M.p. 145°.*p-Nitrophenylhydrazone*: yellowish-red needles from EtOH.Aq. M.p. 154–6°.Simonis, *Ber.*, 1917, 50, 782.Auwers, Koch, *Ann.*, 1924, 439, 167.

See also last reference above.

2-Hydroxy-3-methylpropioiphenone (3-Propionyl-o-cresol, ethyl 2-hydroxy-m-tolyl ketone) $C_{10}H_{12}O_2$

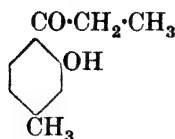
MW, 164

Yellow plates from pet. ether. M.p. 22–3°. B.p. 127–9°/15 mm. $FeCl_3 \rightarrow$ violet col.*Semicarbazone*: cryst. from EtOH. M.p. 202°.Auwers, Wittig, *Ber.*, 1924, 57, 1274.**4-Hydroxy-3-methylpropioiphenone (5-Propionyl-o-cresol, ethyl 6-hydroxy-m-tolyl ketone).**Needles from EtOH.Aq. M.p. 83.5–84°. Sol. EtOH, AcOH. Mod. sol. C_6H_6 . Spar. sol. pet. ether.*Me ether*: $C_{11}H_{14}O_2$. MW, 178. Cryst. M.p. 41°. B.p. 169–71°/25 mm. *Oxime*: plates from EtOH.Aq. M.p. 99°.

See above reference and also

Klages, *Ber.*, 1904, 37, 3991.**6-Hydroxy-3-methylpropioiphenone (3-Propionyl-p-cresol, ethyl 4-hydroxy-m-tolyl ketone).**Cryst. F.p. 2°. B.p. 153°/40 mm., 123–4°/11 mm. D_4^{14} 1.0841. $n_D^{15.9}$ 1.549.*Me ether*: oil. B.p. 149–51°/17 mm., 133.5–6°/10 mm. $D_4^{15.9}$ 1.0514. $n_D^{15.9}$ 1.533. *Oxime*: plates. M.p. 92°.*Et ether*: $C_{12}H_{16}O_2$. MW, 192. Prisms from MeOH.Aq. M.p. 50–1°.*Acetyl*: needles from pet. ether. M.p. 58°. Sol. EtOH, Et_2O , C_6H_6 , AcOH.*Benzoyl*: prisms from EtOH. M.p. 97°. Sol. C_6H_6 , AcOH, hot ligroin. Mod. sol. Et_2O .*Oxime*: prisms from MeOH. M.p. 134–5°. *Semicarbazone*: needles from EtOH. M.p. 211–12°.*Phenylhydrazone*: needles or plates from EtOH or ligroin. M.p. 146°.*p-Nitrophenylhydrazone*: m.p. 188–9°.Klages, *Ber.*, 1904, 37, 3994.Auwers, *Ber.*, 1918, 51, 1123.Hill, Graf, *J. Am. Chem. Soc.*, 1916, 37, 1844.Auwers, Hilliger, Wulf, *Ann.*, 1922, 429, 217.Auwers, Lechner, Bundesmann, *Ber.*, 1925, 58, 45.

2-Hydroxy-4-methylpropiophenone (4-Propionyl-m-cresol, ethyl 3-hydroxy-p-tolyl ketone)



$C_{10}H_{12}O_2$

MW, 164

Leaflets from pet. ether. M.p. 41.5–42.5°. B.p. 115–20°/10 mm. $FeCl_3 \rightarrow$ deep violet col.

Oxime: needles from pet. ether. M.p. 103–4°.

Semicarbazone: needles from EtOH. M.p. 206–8°. Sol. hot EtOH, MeOH, AcOH. Mod. sol. Me_2CO . Insol. C_6H_6 .

Phenylhydrazine: yellow plates from EtOH. M.p. 137–8°.

Auwers, Koch, *Ann.*, 1924, **439**, 174.

Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1688.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 288.

Hydroxymethyl-pyridine.

See Pyridylcarbinol.

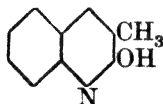
3-Hydroxy-2-methyl- γ -pyrone.

See Maltol.

Hydroxy-2-methylquinoline.

See Hydroxyquinaldine.

2-Hydroxy-3-methylquinoline (3-Methyl-2-quinolinol)



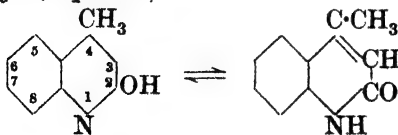
$C_{10}H_9ON$

MW, 159

Yellow needles from dil. EtOH. M.p. 234–5°. Sublimes.

Orstein, *Ber.*, 1907, **40**, 1095.

2-Hydroxy-4-methylquinoline (2-Hydroxy-4-methyl-2-quinolinol, 4-methyl-carbostyryl, lepidone)



$C_{10}H_9ON$

MW, 159

Needles from H_2O . M.p. 223–7°. B.p. 270°/17 mm. Sol. hot H_2O . Spar. sol. cold H_2O , Et_2O , $CHCl_3$, C_6H_6 , ligroin. $P_2S_5 \rightarrow$ thiolepidine. Red. \rightarrow tetrahydrolepidine.

Me ether: $C_{11}H_{11}ON$. MW, 173. B.p. 275–6°. $B_2H_2PtCl_6$: decomp. at 214°.

Knorr, *Ann.*, 1886, **238**, 100.

Reissert, *Ber.*, 1891, **24**, 855.

Tröger, Dunker, *J. prakt. Chem.*, 1925, **109**, 88.

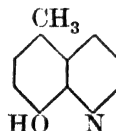
6-Hydroxy-4-methylquinoline (6-Hydroxy-4-methyl-6-quinolinol).

Needles from 50% EtOH. M.p. 216–18°. Sol. hot EtOH, $CHCl_3$.

Me ether: needles from dil. EtOH. M.p. 50–2°. $B_2H_2PtCl_6$: m.p. 236–7°.

Königs, *Ber.*, 1890, **23**, 2673, 2684.

8-Hydroxy-5-methylquinoline (5-Methyl-8-quinolinol)



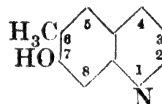
$C_{10}H_9ON$

MW, 159

Needles from dil. EtOH. M.p. 122–4°.

Nölting, Trautmann, *Ber.*, 1890, **23**, 3666.

7-Hydroxy-6-methylquinoline (6-Methyl-7-quinolinol)



$C_{10}H_9ON$

MW, 159

Needles from EtOH. M.p. 244°. B.p. 240°/22 mm., 210°/11 mm.

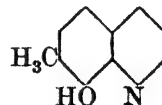
Edinger, Bühler, *Ber.*, 1909, **42**, 4316.

8-Hydroxy-6-methylquinoline (6-Methyl-8-quinolinol).

Needles from $CHCl_3$. M.p. 95–6°. Sublimes. Sol. EtOH, hot NaOH. Spar. sol. H_2O . Volatile in steam. $FeCl_3 \rightarrow$ green col.

Herzfeld, *Ber.*, 1884, **17**, 1552.

8-Hydroxy-7-methylquinoline (7-Methyl-8-quinolinol)

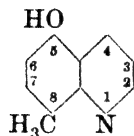


$C_{10}H_9ON$

MW, 159

Needles from dil. EtOH. M.p. 72–4°. $FeCl_3 \rightarrow$ dark green col.

Nölting, Trautmann, *Ber.*, 1890, **23**, 3663.

5-Hydroxy-8-methylquinoline (8-Methyl-5-quinolinol) $C_{10}H_9ON$

MW, 159

M.p. 262–3°. Spar. sol. $CHCl_3$. Sublimes in needles. $FeCl_3 \rightarrow$ reddish-brown col.

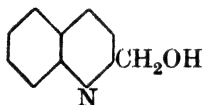
Me ether: $C_{11}H_{11}ON$. MW, 173. B.p. 225–30°.

Herzfeld, *Ber.*, 1884, 17, 905, 1551.

6-Hydroxy-8-methylquinoline (8-Methyl-6-quinolinol).

Needles. M.p. 200°. $FeCl_3 \rightarrow$ brownish-red col.

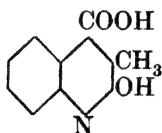
Herzfeld, *Ber.*, 1884, 17, 903.

2-Hydroxymethyl-quinoline (α -Hydroxy-quinaldine, 2-quinoline-carbinol, α -quinolylcarbinol) $C_{10}H_9ON$

MW, 159

Needles from ligroin or EtOH. M.p. 64°. Volatile in steam. $CrO_3 \rightarrow$ 2-aldehydroquinoline.

Hammick, *J. Chem. Soc.*, 1926, 1303.

2-Hydroxy-3-methylquinoline-4-carboxylic Acid (2-Hydroxy-3-methylcinchoninic acid) $C_{11}H_9O_3N$

MW, 203

Needles + H_2O from hot H_2O . M.p. 311–12° (315–17°).

Me ester: $C_{12}H_{11}O_3N$. MW, 217. Needles from MeOH. M.p. 174–5°.

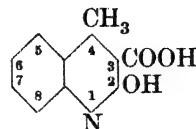
Et ester: $C_{13}H_{13}O_3N$. MW, 231. Needles from dil. EtOH. M.p. 167°.

Amide: $C_{11}H_{10}O_2N_2$. MW, 202. M.p. 353–4°.

Anilide: m.p. 314–15°.

Ornstein, *Ber.*, 1907, 40, 1091, 1094.

Meyer, *Monatsh.*, 1905, 26, 1322; 1907, 28, 38.

2-Hydroxy-4-methylquinoline-3-carboxylic Acid (2-Hydroxylepidine-3-carboxylic acid) $C_{11}H_9O_3N$

MW, 203

Needles from EtOH. M.p. 254–5° decomp. Spar. sol. EtOH. Insol. H_2O , Et_2O , $CHCl_3$, C_6H_6 . Heat \rightarrow 2-hydroxy-4-methylquinoline. Zn \rightarrow 4-methylquinoline.

Et ester: $C_{13}H_{13}O_3N$. MW, 231. M.p. 251–2°.

Nitrile: $C_{11}H_8ON_2$. MW, 184. M.p. 320°.

Camps, *Arch. Pharm.*, 1902, 240, 142.

2-Hydroxy-4-methylquinoline-8-carboxylic Acid (2-Hydroxylepidine-8-carboxylic acid).

Needles from dil. EtOH. M.p. 312° decomp. Mod. sol. EtOH, AcOH. Spar. sol. hot H_2O . Prac. insol. Et_2O , $CHCl_3$, C_6H_6 , ligroin.

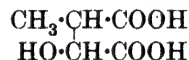
Reissert, *Ber.*, 1891, 24, 853.

Hydroxymethyl-succinic Acid.

See Itamalic Acid.

1-Hydroxy-1-methylsuccinic Acid.

See Citramalic Acid.

2-Hydroxy-1-methylsuccinic Acid (2-Hydroxypyrotartaric acid, 2-methylmalic acid) $C_5H_8O_5$

MW, 148

Prisms from AcOEt. M.p. 123° (119–20°).

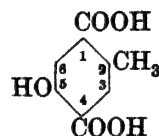
Mono-Et ester: $C_7H_{12}O_5$. MW, 176. Na salt: needles from EtOH. M.p. 166–7°. Sol. H_2O .

Di-Et ester: $C_9H_{16}O_5$. MW, 204. B.p. 250°/745 mm., 138°/17 mm.

Monoamide: $C_5H_9O_4N$. MW, 147. Cryst. M.p. 145–7°. Sol. H_2O . Mod. sol. EtOH.

Wislicenus, *Ber.*, 1892, 25, 199.

Lutz, *J. Russ. Phys. Chem. Soc.*, 1909, 41, 1534.

5-Hydroxy-2-methylterephthalic Acid (p-Cresol-2 : 5-dicarboxylic acid) $C_9H_8O_5$

MW, 196

Prisms from EtOH.Aq. M.p. 285–90° decomp. Sol. EtOH, Et₂O. Spar. sol. H₂O. FeCl₃ → intense red col.

Jacobson, Meyer, *Ber.*, 1883, 16, 191.

6-Hydroxy-2-methylterephthalic Acid (m-Cresol-2 : 5-dicarboxylic acid).

Needles from MeOH. M.p. 280–3°. Alc. FeCl₃ → intense reddish-violet col.

Me ether : C₁₀H₁₀O₅. MW, 210. Cryst. from H₂O. M.p. 267°. Spar. sol. H₂O. FeCl₃ → yellow ppt.

Perkin, *J. Chem. Soc.*, 1899, 75, 194.

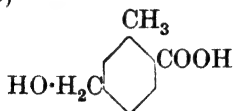
6-Hydroxy-2-methyltetrahydropyran.

See 4-Hydroxy-*n*-caproic Aldehyde.

8-Hydroxy-*N*-methyl-1 : 2 : 3 : 4-tetrahydroquinoline.

See Kairine.

5-Hydroxymethyl-*o*-toluic Acid (4- α -Hydroxy-2 : 4-dimethylbenzoic acid, 2-methyl-4-hydroxymethylbenzoic acid, 3-methyl-4-carboxybenzyl alcohol)

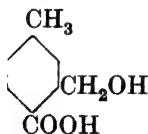


C₉H₁₀O₃ MW, 166

Plates from H₂O. M.p. 141–2°.

Perkin, Stone, *J. Chem. Soc.*, 1925, 127, 2286.

3-Hydroxymethyl-*p*-toluic Acid (2- α -Hydroxy-2 : 4-dimethylbenzoic acid, 4-methyl-2-hydroxymethylbenzoic acid, 3-methyl-6-carboxybenzyl alcohol)



C₉H₁₀O₃ MW, 166

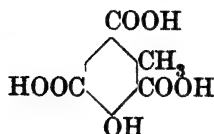
Needles from H₂O. M.p. 132–3°.

Perkin, Stone, *J. Chem. Soc.*, 1925, 127, 2285.

Hydroxymethyl *p*-tolyl Ketone.

See *p*-Methylphenacyl Alcohol.

4-Hydroxy-2-methyltrimesic Acid (m-Cresol-2 : 4 : 6-tricarboxylic acid, 2 : 4 : 6-tricarboxy-*m*-cresol)



C₁₀H₈O₇ MW, 240

Needles + 2H₂O from H₂O. Loses H₂O at 257°. M.p. anhyd. 280°. Sol. EtOH. Spar. sol. H₂O, AcOH. Insol. Et₂O, CHCl₃. FeCl₃ → reddish-violet col.

Mono-Et ester : C₁₂H₁₂O₇. MW, 268. Needles + 1H₂O from H₂O. M.p. anhyd. 224° decomp. Sol. EtOH, Et₂O. Mod. sol. toluene. FeCl₃ → reddish-violet col.

Di-Et ester : C₁₄H₁₆O₇. MW, 296. Prisms from EtOH. M.p. 137–8°. Sol. EtOH, Et₂O. Spar. sol. ligroin. Insol. H₂O. FeCl₃ → reddish-violet col.

Tri-Et ester : C₁₆H₂₀O₇. MW, 324. Prisms from EtOH. M.p. 47°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. ligroin. Insol. H₂O.

Et ether : C₁₂H₁₂O₇. MW, 268. Needles from EtOH. M.p. 242–3° decomp. *Mono-Et ester* : C₁₄H₁₆O₇. MW, 296. Prisms from H₂O. M.p. 195°. FeCl₃ → brown ppt. *Tri-Et ester* : C₁₈H₂₄O₇. MW, 352. Oil. B.p. about 365° decomp.

Errera, *Ber.*, 1899, 32, 2781; *Gazz. chim. ital.*, 1901, 31, 145.

α -Hydroxymethyl-triphenylmethane.

See 2-Hydroxy-1 : 1 : 1-triphenylethane.

Hydroxymethylurea.

See Methylolurea.

1-Hydroxymyristic Acid

CH₃·[CH₂]₁₁·CH(OH)·COOH
C₁₄H₂₈O₃ MW, 244

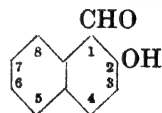
Plates from CHCl₃. M.p. 81–2°. Sol. EtOH, Et₂O, Me₂CO. Spar. sol. CHCl₃, pet. ether.

Amide : C₁₄H₂₉O₂N. MW, 243. Plates from EtOH. M.p. 150°. Insol. Et₂O, C₆H₆, CHCl₃, pet. ether.

Nitrile : C₁₄H₂₇ON. MW, 225. Plates from pet. ether. M.p. 44·5°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃.

Le Sueur, *J. Chem. Soc.*, 1905, 87, 1904.

2-Hydroxy-1-naphthaldehyde (1-Aldehyde-2-naphthol)



C₁₁H₈O₂ MW, 172

Prisms from EtOH or needles from AcOEt. M.p. 82°. B.p. 192°/27 mm. Sol. EtOH, Et₂O, pet. ether. Insol. H₂O. Sol. aq. alkalis. Sol. conc. H₂SO₄ to yellow sol. Spar. volatile in steam. FeCl₃ → brown col. Reduces NH₃·AgNO₃ but not Fehling's. Ac₂O + CH₃·COONa at 180° → benzcoumarin. Malonic acid + AcOH → benzcoumarin-carboxylic

acid. $\text{CH}_3\text{COCl} \rightarrow$ anhydro-di-2-hydroxy-1-naphthaldehyde, cryst. from AcOH, m.p. 241° .

Me ether: $\text{C}_{12}\text{H}_{10}\text{O}_2$. MW, 186. Needles from EtOH. M.p. 84° . B.p. $200-1^\circ/11$ mm. Sol. C_6H_6 , AcOH. Ox. \rightarrow 2-methoxy-1-naphthoic acid. *Azine*: yellow prisms from PhNO_2 . M.p. $255-6^\circ$.

Et ether: $\text{C}_{13}\text{H}_{12}\text{O}_2$. MW, 200. Needles from EtOH. M.p. $115^\circ(109^\circ)$. *Semicarbazone*: yellow needles from EtOH. M.p. $214-15^\circ$. *Phenylhydrazone*: m.p. 91° . *Azine*: yellow cryst. from PhNO_2 -EtOH. M.p. 184° .

2-Acetyl: cryst. from EtOH. M.p. 87° . Sol. most org. solvents.

Triacetyl deriv.: leaflets from EtOH. M.p. 124° . Sol. EtOH, AcOH.

Oxime: needles. M.p. 157° . Sol. alkalis. Acetyl: m.p. 124° .

Semicarbazone: yellow needles from MeOH. M.p. 240° decomp.

Azine: yellow needles from PhNO_2 . M.p. above 290° . Spar. sol. most org. solvents.

Picrate: m.p. 120° .

$\text{C}_{11}\text{H}_8\text{O}_2$, $\text{C}_6\text{H}_3(\text{NO}_2)_3$ -1 : 3 : 5: m.p. 137° .

Gattermann, v. Horlacher, *Ber.*, 1899, **32**, 285.

Fosse, *Bull. soc. chim.*, 1901, **25**, 373.

Kauffmann, *Ber.*, 1883, **16**, 383.

Gattermann, *Ann.*, 1907, **357**, 366.

Rousset, *Bull. soc. chim.*, 1897, **17**, 312.

Torrey, Brewster, *J. Am. Chem. Soc.*, 1913, **35**, 439.

3-Hydroxy-1-naphthaldehyde (4-Aldehydo-1-naphthol).

Me ether: plates from pet. ether. M.p. 60° . *Semicarbazone*: needles from EtOH.Aq. M.p. 200° . *Oxime*: needles from EtOH.Aq. M.p. 102° . *p-Nitrophenylhydrazone*: red needles from AcOH. M.p. 197° .

Shoesmith, Rubli, *J. Chem. Soc.*, 1927, 3101.

4-Hydroxy-1-naphthaldehyde (4-Aldehydo-1-naphthol).

Yellowish needles from H_2O . M.p. 181° . Sol. EtOH, Et_2O . Insol. cold H_2O .

Me ether: white powder. M.p. 34° . B.p. $212^\circ/40$ mm., $200^\circ/11$ mm. Ox. \rightarrow 4-methoxy-1-naphthoic acid. *Phenylhydrazone*: m.p. 113° . *Azine*: yellow needles from EtOH. M.p. 185° .

Et ether: yellowish cryst. from AcOEt. M.p. 72° . *Hydrazone*: dark red needles. M.p. $160-82^\circ$ decomp. *Azine*: yellow needles from PhNO_2 . M.p. 209° .

4-Acetyl: m.p. 110° .

Semicarbazone: m.p. 224° .

Hydrazone: dark red ppt. M.p. $220-36^\circ$.

Azine: yellow needles from PhNO_2 . M.p. 236° .

Kamm, McCluggage, Landstrom, *J. Am. Chem. Soc.*, 1917, **39**, 1247.

Gattermann, v. Horlacher, *Ber.*, 1899, **32**, 285.

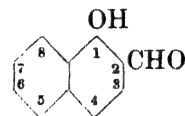
Rousset, *Bull. soc. chim.*, 1897, **17**, 312.

5-Hydroxy-1-naphthaldehyde (5-Aldehydo-1-naphthol).

Me ether: yellow plates from pet. ether. M.p. 66° . *Semicarbazone*: needles from AcOH.Aq. M.p. 246° . *Oxime*: needles from H_2O . M.p. 104° . *p-Nitrophenylhydrazone*: red needles from AcOH.Aq. M.p. 246° .

Shoesmith, Rubli, *J. Chem. Soc.*, 1926, 3242.

1-Hydroxy-2-naphthaldehyde (2-Aldehydo-1-naphthol)



$\text{C}_{11}\text{H}_8\text{O}_2$

MW, 172

Greenish-yellow needles from EtOH.Aq. M.p. $59-60^\circ$. Spar. sol. cold H_2O . Yellow sols. in alkalis. Spar. volatile in steam. Reduces NH_3 - AgNO_3 . $\text{FeCl}_3 \rightarrow$ green sol.

Me ether: $\text{C}_{12}\text{H}_{10}\text{O}_2$. MW, 186. Prisms from EtOH. M.p. 47° . Sol. most org. solvents.

Oxime: needles from C_6H_6 . M.p. 145° .

Bezdik, Friedländer, *Monatsh.*, 1909, **30**, 278.

Friedländer, *Ber.*, 1908, **41**, 1037.

Weil, *Ber.*, 1911, **44**, 3058.

3-Hydroxy-2-naphthaldehyde (Iso- β -naphthaldehyde, 3-aldehydo-2-naphthol).

Yellow plates from AcOH.Aq. M.p. $99-100^\circ$. *Acetyl*: cryst. from C_6H_6 . M.p. $100-1^\circ$. *Anhydride*: m.p. 156° . *Semicarbazone*: m.p. $211-12^\circ$. *Oxime*: m.p. $202-3^\circ$.

Oxime: m.p. 207° decomp.

Phenylhydrazone: m.p. $246-8^\circ$.

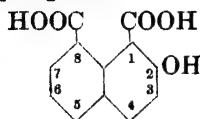
Semicarbazone: cryst. from MeOH. M.p. above 270° .

Anil: m.p. $158-9^\circ$.

Boehm, Profft, *Arch. Pharm.*, 1931, **269**, 25.

Hydroxynaphthalene.

See Naphthol.

2-Hydroxynaphthalic Acid $C_{12}H_8O_5$

MW, 232

Free acid exists only in solution.

Anhydride: $C_{12}H_6O_4$. MW, 214. Needles. M.p. 245–6°.*Me ether*: free acid not isolated. *Anhydride*: $C_{13}H_8O_4$. MW, 228. M.p. 255°.Dziwowski, Kocwa, Geschwindowna, *Chem. Zentr.*, 1929, I, 650.**3-Hydroxynaphthalic Acid.**

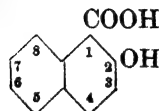
Free acid exists only in solution.

Anhydride: yellow needles from EtOH. M.p. 287°. Sol. EtOH, AcOH, Insol. H_2O , C_6H_6 . Sol. alkalis. *Acetyl*: leaflets from AcOEt. M.p. 216°. Sol. C_6H_6 . Spar. sol. EtOH. Insol. H_2O .*Me ether*: free acid not isolated. *Anhydride*: yellow needles from AcOEt. M.p. 244°. Sol. AcOH, C_6H_6 . Spar. sol. EtOH. Insol. H_2O .Anselm, Zuckmayer, *Ber.*, 1899, 32, 3288.Dziwowski, Galitzerowna, Kocwa, *Chem. Zentr.*, 1926, II, 2816.**4-Hydroxynaphthalic Acid.**

Free acid exists only in solution.

Anhydride: light yellow cryst. M.p. 350–1°. Brown sols. in alkalis. NaOH fusion \rightarrow 5-hydroxy-1-naphthoic acid. Resorcinol \rightarrow 4-hydroxynaphthofluorescein. *Acetyl*: m.p. 188–9°. *Benzoyl*: m.p. 235–6°.*Me ether*: free acid not isolated. *Anhydride*: yellow cryst. M.p. 256–8°.Dziwowski, Kocwa, Geschwindowna, *Chem. Zentr.*, 1929, I, 650.

See also second reference above.

2-Hydroxy-1-naphthoic Acid (2-Naphthol-1-carboxylic acid) $C_{11}H_8O_3$

MW, 188

Needles from EtOH.Aq. M.p. 156–7°. Very sol. EtOH. Sol. Et_2O , $CHCl_3$, ligroin, C_6H_6 . Spar. sol. H_2O . Loses CO_2 readily at m.p.*Me ester*: $C_{12}H_{10}O_3$. MW, 202. M.p. 76° (80°).*Et ester*: $C_{13}H_{12}O_3$. MW, 216. M.p. 55°.*Me ether*: $C_{13}H_{10}O_3$. MW, 202. Prisms from EtOH. M.p. 176° decomp. Sol. Et_2O , $CHCl_3$, CS_2 , Me_2CO , C_6H_6 . Insol. ligroin. *Me ester*: $C_{13}H_{12}O_3$. MW, 216. Cryst. from EtOH. M.p. 52°.*Et ether*: $C_{13}H_{12}O_3$. MW, 216. Plates from EtOH.Aq. M.p. 142°. Sol. Et_2O , Me_2CO , $CHCl_3$, CS_2 , C_6H_6 . Insol. ligroin.*Acetyl*: needles from H_2O . M.p. 130–5–131–5°. Sol. most org. solvents with exception of ligroin and CCl_4 . *Chloride*: needles from $CHCl_3$. M.p. 140–1°.Tijmstra Bz, Eggink, *Ber.*, 1906, 39, 14.Bodroux, *Compt. rend.*, 1904, 31, 32.Werner, Seybold, *Ber.*, 1904, 37, 3661.Zetzsche, Flutsch, Enderlin, Loosli, *Helv. Chim. Acta*, 1926, 9, 184.**3-Hydroxy-1-naphthoic Acid (2-Naphthol-4-carboxylic acid).**Needles from H_2O . M.p. 248–9° (242–3°). $FeCl_3 \rightarrow$ reddish-brown col.*Me ester*: needles from CCl_4 . M.p. 91–2°.*Amide*: $C_{11}H_9O_2N$. MW, 187. Prisms from H_2O . M.p. 209–11°.*Anilide*: needles from MeOH. M.p. 112–13°.*Me ether*: prismatic needles from AcOH.Aq. M.p. 159°.*Acetyl*: needles from EtOH.Aq. M.p. 169–70° (173–4°). *Chloride*: cryst. from pet. ether. M.p. 96–7°. *Amide*: needles from MeOH. M.p. 180–1°. *Anilide*: needles from AcOH.Aq. M.p. 178–9°.*Benzoyl*: cryst. from xylene. M.p. 222–3°.Lesser, Gad, *Ber.*, 1925, 58, 2553.**4-Hydroxy-1-naphthoic Acid (1-Naphthol-4-carboxylic acid).**Needles from Et_2O -ligroin. M.p. 183–4° decomp. Very sol. EtOH, Me_2CO , Et_2O . Spar. sol. $CHCl_3$, C_6H_6 . Insol. ligroin.*Me ester*: cryst. from MeOH. M.p. 178°.*Et ester*: cryst. M.p. 134°.*Acetyl*: needles from toluene. M.p. 178–9°. Very sol. EtOH, Me_2CO . Sol. $CHCl_3$, Et_2O .*Me ether*: needles from EtOH. M.p. 232°. *Amide*: $C_{12}H_{11}O_2N$. MW, 201. Needles from EtOH. M.p. 234°.*Et ether*: needles from EtOH. M.p. 214°. *Amide*: $C_{13}H_{13}O_2N$. MW, 215. Needles from EtOH. M.p. 244°.Heller, *Ber.*, 1912, 45, 675.Gattermann, Hess, *Ann.*, 1888, 244, 73.Montmollin, Spiellev, U.S.P., 1,474,928, (*Chem. Abstracts*, 1924, 18, 693).**5-Hydroxy-1-naphthoic Acid (1-Naphthol-5-carboxylic acid).**Needles from H_2O . M.p. 235–6°. Very sol.

EtOH. Sol. Et₂O, AcOH. Spar. sol. H₂O. Sublimes. FeCl₃ → violet ppt.

Et ester: C₁₃H₁₂O₃. MW, 216. M.p. 73°.

Acetyl: m.p. 202–3°.

Benzoyl: m.p. 241°.

Me ether: C₁₂H₁₀O₃. MW, 202. Plates from MeOH. M.p. 227–228.5°.

Fuson, *J. Am. Chem. Soc.*, 1924, **46**, 2787.

Dziewoński, Kocwa, *Chem. Abstracts*, 1929, **23**, 2435.

6-Hydroxy-1-naphthoic Acid (2-Naphthol-5-carboxylic acid).

Needles from H₂O. M.p. 208–9°. Sol. EtOH, Et₂O, Me₂CO, warm AcOH. Spar. sol. CHCl₃, C₆H₆. FeCl₃ → dark brown col.

Acetyl: needles from AcOH.Aq. or toluene. M.p. 209–10°.

Anilide: needles from AcOH. M.p. 193–4°. Insol. most org. solvents.

Royle, Schedler, *J. Chem. Soc.*, 1923, **123**, 1645.

7-Hydroxy-1-naphthoic Acid (2-Naphthol-8-carboxylic acid).

Needles from H₂O. M.p. 253–4°. Very sol. EtOH. Sol. hot H₂O. Spar. sol. cold H₂O. FeCl₃ → dark brown col.

Acetyl: needles from EtOH.Aq. M.p. 221–2°.

Benzoyl: m.p. 194°.

Anilide: needles from AcOH. M.p. 209–10°.

Me ether: colourless needles. M.p. 167–8°.

Davies, Heilbron, Irving, *J. Chem. Soc.*, 1932, 2715.

Dziewoński, Galitzewowna, Kocwa, *Chem. Abstracts*, 1928, **22**, 1154.

See also previous reference.

8-Hydroxy-1-naphthoic Acid (1-Naphthol-8-carboxylic acid).

Needles from Et₂O. M.p. 169°. Very sol. hot H₂O, EtOH, Et₂O. Passes readily into its lactone.

Me ether: C₁₂H₁₀O₃. MW, 202. Needles from C₆H₆. M.p. 162–3°. *Me ester*: C₁₃H₁₂O₃. MW, 216. Plates from pet. ether. M.p. 51–2°.

Et ether: C₁₃H₁₂O₃. MW, 216. Needles from C₆H₆. M.p. 210–11°.

Propyl ether: C₁₄H₁₄O₃. MW, 230. Cryst. from C₆H₆. M.p. 176–7°.

Butyl ether: C₁₅H₁₆O₃. MW 244. Needles from C₆H₆. M.p. 154–5°.

Phenyl ether: 1-phenoxy-naphthalene-8-carboxylic acid. C₁₇H₁₂O₃. MW, 264. Needles. M.p. 139–40°.

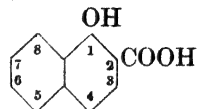
Benzyl ether: C₁₆H₁₄O₃. MW, 278. Cryst. from ligroin. M.p. 125–6°.

Lactone: naphtholactone. C₁₁H₈O₂. MW, 170. Needles from EtOH.Aq. M.p. 108°. Very sol. EtOH, Et₂O, CS₂. Sublimes in needles.

Rule, Barnett, *J. Chem. Soc.*, 1932, 2732.

Ekstrand, *J. prakt. Chem.*, 1888, **38**, 278.

1-Hydroxy-2-naphthoic Acid (1-Naphthol-2-carboxylic acid)



C₁₁H₈O₃

MW, 188

Needles from EtOH or Et₂O. M.p. 191–2°. Very sol. EtOH, Et₂O. Sol. hot H₂O. Spar. sol. cold H₂O.

Me ester: C₁₂H₁₀O₃. MW, 202. Plates. M.p. 78°.

Et ester: C₁₃H₁₂O₃. MW, 216. Cryst. from EtOH. M.p. 49°.

Chloride: C₁₁H₇O₂Cl. MW, 206.5°. Needles from pet. ether. M.p. 85–6°.

Amide: C₁₁H₉O₂N. MW, 187. Cryst. from amyl alcohol. M.p. 202°.

Anilide: cryst. M.p. 154°.

Acetyl: m.p. 158°.

Me ether: C₁₂H₁₀O₃. MW, 202. Needles from EtOH.Aq. M.p. 127°.

Me ester: C₁₃H₁₂O₃. MW, 216. B.p. 193–5°/17 mm.

Et ester: C₁₄H₁₄O₃. MW, 230. B.p. 184–5°/14 mm.

Schmitt, Burkard, *Ber.*, 1887, **20**, 2699.

Cohen, Dudley, *J. Chem. Soc.*, 1910, **97**, 1747.

Weber, Runkel, *Ann.*, 1906, **346**, 361.

3-Hydroxy-2-naphthoic Acid (2:3-Hydroxynaphthoic acid, β-hydroxynaphthoic acid, β-oxy-naphthoic acid, 2-naphthol-3-carboxylic acid).

Yellow cryst. from H₂O or AcOH. M.p. 222–3°. Very sol. EtOH, Et₂O. Sol. CHCl₃, C₆H₆. Spar. sol. H₂O. FeCl₃ → blue col. The arylides are widely used as coupling components for the so-called "azoic" or "ice" colours.

Me ester: C₁₂H₁₀O₃. MW, 202. Needles from EtOH. M.p. 75–6°.

Et ester: C₁₃H₁₂O₃. MW, 216. Needles from AcOH. M.p. 85°. B.p. 290–1°.

Chloride: C₁₁H₇O₂Cl. MW, 206.5. Needles from ligroin. M.p. 95–6°.

Amide: $C_{11}H_9O_2N$. MW, 187. Yellow needles from EtOH or AcOH. M.p. 217–18°.

Nitrile: $C_{11}H_7ON$. MW, 169. Cryst. from EtOH. M.p. 188–9°.

Anilide: plates from chlorobenzene. M.p. 243–4°. Sol. hot AcOH, $PhNO_2$. Spar. sol. EtOH, AcOEt, xylene. *N-Et*: plates from AcOEt. M.p. 153–4°.

o-Chloroanilide: needles from EtOH. M.p. 225–6°.

m-Chloroanilide: cryst. from chlorobenzene. M.p. 241–2°.

p-Chloroanilide: leaflets from *o*-dichlorobenzene. M.p. 258–9°.

2:5-Dichloroanilide: needles from EtOH. M.p. 246–7°.

o-Nitroanilide: yellow cryst. from xylene. M.p. 192–3°.

m-Nitroanilide: yellow cryst. from AcOH. M.p. 246–7°.

p-Nitroanilide: yellow cryst. from *o*-dichlorobenzene. M.p. 258–9°.

2:4-Dinitroanilide: yellow cryst. from chlorobenzene. M.p. 256–7°.

4-Chloro-o-nitroanilide: yellow leaflets from xylene. M.p. 221–2°.

o-Hydroxyanilide: cryst. from solvent naphtha. M.p. 214–15° decomp.

o-Anisidide: needles from EtOH. M.p. 167–8°.

p-Anisidide: leaflets from EtOH. M.p. 230°.

o-Toluidide: leaflets from solvent naphtha. M.p. 195–6°.

p-Toluidide: needles from solvent naphtha. M.p. 221–2°.

α -Naphthalide: cryst. from xylene. M.p. 222–3°.

β -Naphthalide: needles from chlorobenzene. M.p. 243–4°.

Me ether: $C_{13}H_{10}O_3$. MW, 202. Cryst. from C_6H_6 . M.p. 134–5°. *Me ester*: $C_{13}H_{12}O_3$. MW, 216. Cryst. from C_6H_6 . M.p. 134–5°. *Amide*: $C_{12}H_{11}O_2N$. MW, 201. Cryst. from Me_2CO . M.p. 172–3°. *Nitrile*: $C_{12}H_9ON$. MW, 183. Plates from MeOH. M.p. 132–3°.

Et ether: $C_{13}H_{12}O_3$. MW, 216. Needles from EtOH. M.p. 124° decomp. *Et ester*: $C_{15}H_{14}O_3$. MW, 244. Plates. M.p. 60°. B.p. 300–3°/325 mm., 152°/80 mm. *Amide*: $C_{13}H_{13}O_2N$. MW, 215. Needles from EtOH. M.p. 178°.

Acetyl: needles from EtOH. M.p. 184–6°. *Me ester*: needles. M.p. 101°. *Et ester*: prisms. M.p. 82–3°. *Amide*: needles from Me_2CO . M.p. 185°. *Chloride*: cryst. from

ligroin. M.p. 89°. *Nitrile*: plates from MeOH.Aq. M.p. 118°.

Lesser, Kranepuhl, Gad, *Ber.*, 1925, 58, 2115.

D.R.P., 294,799, (*Chem. Zentr.*, 1916, II, 1095).

Griesheim, D.R.P., 293,897, (*Chem. Zentr.*, 1916, II, 617).

4-Hydroxy-2-naphthoic Acid (1-Naphthol-3-carboxylic acid).

Needles from H_2O . M.p. 182–3°. $FeCl_3 \rightarrow$ golden turbidity.

Acetyl: needles from EtOH.Aq. M.p. 167–8°.

Butler, Royle, *J. Chem. Soc.*, 1923, 123, 1653.

5-Hydroxy-2-naphthoic Acid (1-Naphthol-6-carboxylic acid).

Needles from H_2O or EtOH.Aq. M.p. 210–11°. $FeCl_3 \rightarrow$ red ppt. which turns yellow then black.

Et ester: $C_{13}H_{12}O_3$. MW, 216. Needles from EtOH.Aq. or AcOH.Aq. M.p. 150–1°.

Acetyl: needles from EtOH.Aq. M.p. 214–15°.

Anilide: needles from AcOH.Aq. M.p. 163–4°.

See previous reference.

6-Hydroxy-2-naphthoic Acid (2-Naphthol-6-carboxylic acid).

Needles from H_2O . M.p. 240–1°. $FeCl_3 \rightarrow$ orange col.

Et ester: needles from EtOH.Aq. M.p. 111–12°.

Acetyl: needles from H_2O . M.p. 221–3°.

Anilide: needles from AcOH.Aq. M.p. 197–8°.

Butler, Royle, *J. Chem. Soc.*, 1923, 123, 1654.

7-Hydroxy-2-naphthoic Acid (2-Naphthol-7-carboxylic acid).

Needles from EtOH.Aq. M.p. 269–70°. $FeCl_3 \rightarrow$ orange col.

Acetyl: needles from EtOH.Aq. M.p. 209–10°.

Anilide: needles from EtOH.Aq. or AcOH.Aq. M.p. 219–20°.

See previous reference.

8-Hydroxy-2-naphthoic Acid (1-Naphthol-7-carboxylic acid).

Needles from H_2O . M.p. 228–9° (210°). $FeCl_3 \rightarrow$ red ppt. changing to violet then black.

Et ester: needles from EtOH.Aq. M.p. 135–7°.

Acetyl: needles from EtOH.Aq. M.p. 176–7°.

Anilide: needles from AcOH.Aq. M.p. 239–40°.

Me ether : $C_{12}H_{10}O_3$. MW, 202. Cryst. from Et_2O . M.p. 214° . *Me ester* : $C_{13}H_{12}O_3$. MW, 216. Cryst. from $EtOH.Aq.$ M.p. 72° .

Girardet, *Helv. Chim. Acta*, 1931, 14, 516.
Butler, Royle, *J. Chem. Soc.*, 1923, 123, 1654.

5-Hydroxy-1 : 4-naphthoquinone.

See Juglone.

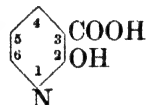
2-Hydroxy- α -naphthoquinonimine.

See 4-Amino- β -naphthoquinone.

Hydroxynaphthylamine.

See Aminonaphthol.

2-Hydroxynicotinic Acid (2-Hydroxypyridine-3-carboxylic acid)



$C_5H_5O_3N$ MW, 127

Needles from H_2O . M.p. 256° . Spar. sol. cold H_2O . No col. with $FeCl_3$. $FeSO_4 \rightarrow$ yellow col. Dist. \rightarrow 2-hydroxypyridine.

Weidel, Strache, *Monatsh.*, 1886, 7, 295.

Philips, *Ann.*, 1895, 288, 264.

Sucharda, *Chem. Abstracts*, 1925 19, 72.

4-Hydroxynicotinic Acid (4-Hydroxypyridine-3-carboxylic acid).

Needles. M.p. 250° decomp. \rightarrow 4-hydroxypyridine.

Kirpal, *Monatsh.*, 1902, 23, 936.

6-Hydroxynicotinic Acid (6-Hydroxypyridine-3-carboxylic acid).

Needles from H_2O . M.p. 304° ($301-2^\circ$) decomp. Insol. $EtOH$, Et_2O , C_6H_6 , $CHCl_3$. $FeCl_3 \rightarrow$ yellow col. Does not combine with acids. Sublimes.

Me ester : $C_6H_{10}O_3N$. MW, 144. Leaflets from Me_2CO . M.p. 164° .

Et ester : $C_7H_{12}O_3N$. MW, 158. Cryst. from Me_2CO . Sol. $EtOH$, $CHCl_3$. Mod. sol. Et_2O , Me_2CO . Insol. H_2O .

Me ether : $C_6H_{10}O_3N$. MW, 144. Needles from H_2O . M.p. $237-8^\circ$. Sol. $EtOH$, Et_2O , $AcOH$. Insol. C_6H_6 , $CHCl_3$. *Et ester* : $C_7H_{12}O_3N$. MW, 172. Prisms from $EtOH$. M.p. 71° . B.p. $135^\circ/0.25$ mm.

Et ether : $C_7H_{12}O_3N$. MW, 158. Cryst. from $EtOH$. M.p. 183° .

Reissert, *Ber.*, 1895, 28, 122.

Meyer, *Monatsh.*, 1901, 22, 440.

Ruzicka, *Helv. Chim. Acta*, 1921, 4, 504.

Tschitschibabin, Kirssanow, *Ber.*, 1924, 57, 1162.

Räth, Schiffmann, *Ann.*, 1931, 487, 130.

3-Hydroxynonane.

See Ethyl-*n*-hexylcarbinol.

3-Hydroxyoctadecane.

See Ethylpentadecylcarbinol.

Hydroxyoctane.

See *n*-Octyl Alcohol, *sec*.-*n*-Octyl Alcohol, Ethyl-*n*-amylcarbinol, and Propylbutylcarbinol.

5-Hydroxyoctanone-4.

See Butyrolin.

1-Hydroxypalmitic Acid



$C_{16}H_{32}O_3$ MW, 272

Needles from $CHCl_3$. M.p. $86-7^\circ$ ($82-3^\circ$). Sol. $EtOH$, Et_2O . Insol. pet. ether. Ox. \rightarrow pentadecylic acid. Dist. \rightarrow pentadecyl aldehyde.

Me ester : $C_{17}H_{34}O_3$. MW, 286. Cryst. from Me_2CO . M.p. $59-60^\circ$.

Et ester : $C_{18}H_{36}O_3$. MW, 300. Cryst. from $EtOH$. M.p. $55.5-56.5^\circ$.

Amide : $C_{16}H_{33}O_2N$. MW, 271. Plates from $EtOH$. M.p. 150° . Insol. most cold org. solvents.

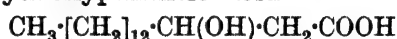
Nitrile : pentadecyl aldehyde cyanhydrin. $C_{16}H_{31}ON$. MW, 253. Needles from pet. ether. M.p. $52.5-53.5^\circ$. Sol. $EtOH$, Et_2O , $CHCl_3$, C_6H_6 . Hot $HCl.Aq.$ \rightarrow amide.

Et ether : $C_{18}H_{36}O_3$. MW, 300. M.p. 45° .

Le Sueur, *J. Chem. Soc.*, 1905, 87, 1895.

Levene, West, *J. Biol. Chem.*, 1914, 18, 466.

2-Hydroxypalmitic Acid



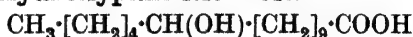
$C_{16}H_{32}O_3$ MW, 272

Leaflets from $CHCl_3$. M.p. $83-83.5^\circ$.

Acetyl : m.p. 58° .

Robinet, *Bull. soc. chim. Belg.*, 1931, 40, 710.

10-Hydroxypalmitic Acid



$C_{16}H_{32}O_3$ MW, 272

dl.

Cryst. from $AcOEt$. M.p. $68-9^\circ$.

Me ester : $C_{17}H_{34}O_3$. MW, 286. Cryst. from pet. ether. M.p. $40.5-41.5^\circ$. B.p. $183-6^\circ/3$ mm.

d.

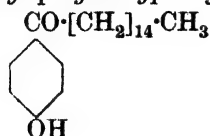
See Jalapinolic Acid.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, 50, 1753.

15-Hydroxypalmitic Acid.

See Juniperic Acid.

p-Hydroxypalmitophenone (*p*-Palmityl-phenol, pentadecyl *p*-hydroxyphenyl ketone)



$\text{C}_{22}\text{H}_{36}\text{O}_2$ MW, 332
Needles from ligroin. M.p. 78°. Sol. usual org. solvents.

Me ether: *p*-palmitylanisole. $\text{C}_{23}\text{H}_{38}\text{O}_2$. MW, 346. Cryst. M.p. 70.5°. B.p. 279–80°. D_{20}^{25} 0.8981. n_D^{20} 1.47605. Hot. dil. HCl \rightarrow anisic acid.

Et ether: *p*-palmitylphenetole. $\text{C}_{24}\text{H}_{40}\text{O}_2$. MW, 360. Plates from EtOH. M.p. 69°. B.p. 288–9°/15 mm. Spar. sol. cold EtOH. Dil. $\text{HNO}_3 \rightarrow$ *p*-ethoxybenzoic acid.

Krafft, *Ber.*, 1888, 21, 2269.

Auwers, *Ber.*, 1903, 36, 3891.

Eijkman, Bergema, Henrard, *Chem. Zentr.*, 1905, I, 816.

1-Hydroxypelargonic Acid



$\text{C}_9\text{H}_{18}\text{O}_3$ MW, 174

Plates. M.p. 70°.

Et ester: $\text{C}_{11}\text{H}_{22}\text{O}_3$. MW, 202. Needles. M.p. 23–4°.

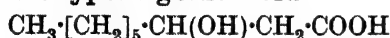
Anilide: m.p. 69–70°.

Acetyl: b.p. 171–4°/10 mm.

Blaise, *Bull. soc. chim.*, 1904, 31, 491;

Compt. rend., 1904, 138, 698.

2-Hydroxypelargonic Acid



$\text{C}_9\text{H}_{18}\text{O}_3$ MW, 174

*d*l.

Plates from pet. ether. M.p. 47–8°. $[\alpha]_D^{20}$ 2° 26' in EtOH. Sol. EtOH, Et_2O , hot pet. ether. Insol. H_2O .

dl.

Needles. M.p. 61° (57–9°). Sol. EtOH, C_6H_6 , AcOH, CHCl_3 , AcOEt.

Et ester: $\text{C}_{11}\text{H}_{22}\text{O}_3$. MW, 202. B.p. 145°/13 mm.

Haller, Brochet, *Compt. rend.*, 1910, 150, 500.

Harding, Weizmann, *J. Chem. Soc.*, 1910, 97, 302.

Brooks, Humphrey, *J. Am. Chem. Soc.*, 1918, 40, 838.

Asano, *Journal of the Pharmaceutical Society, Japan*, 1924, 504, 75, (*Chem. Abstracts*, 1924, 18, 1645).

Dict. of Org. Comp.—II.

6-Hydroxypelargonic Acid



$\text{C}_9\text{H}_{18}\text{O}_3$ MW, 174

B.p. 204°/25 mm.

Et ester: $\text{C}_{11}\text{H}_{22}\text{O}_3$. MW, 202. B.p. 151–2°/18 mm.

Blaise, Koehler, *Compt. rend.*, 1909, 148, 1773; *Bull. soc. chim.*, 1910, 7, 415.

8-Hydroxypelargonic Acid



$\text{C}_9\text{H}_{18}\text{O}_3$ MW, 174

Cryst. from AcOEt. M.p. 53–4°.

Me ester: $\text{C}_{10}\text{H}_{20}\text{O}_3$. MW, 188. B.p. 137–9°/3 mm. D_{20}^{20} 0.9588. n_D 1.4438. *Phenylurethane*: cryst. from pet. ether. M.p. 53–4°.

Acetyl: f.p. 1°. B.p. 192–3°/10 mm. D_{20}^{20} 1.025.

Lycan, Adams, *J. Am. Chem. Soc.*, 1929, 51, 628.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, 12, 467.

Hydroxypentadecenylbenzene.

See Ginkgol.

Hydroxypentadecenylbenzoic Acid.

See Ginkgolic Acid.

Hydroxypentadecylbenzene.

See Hydroginkgol.

Hydroxypentadecylbenzoic Acid.

See Hydroginkgolic Acid.

1-Hydroxypentadecylic Acid (*1-Hydroxypentadecoic acid*, *1-hydroxytetradecane-1-carboxylic acid*)



$\text{C}_{15}\text{H}_{30}\text{O}_3$ MW, 258

Needles from CHCl_3 . M.p. 84.5°. Sol. EtOH, Et_2O . Spar. sol. C_6H_6 . Heat at 275° \rightarrow myristic aldehyde.

Amide: $\text{C}_{15}\text{H}_{31}\text{O}_2\text{N}$. MW, 257. Plates from EtOH. M.p. 149–50°. Insol. H_2O , CHCl_3 , C_6H_6 , pet. ether.

Nitrile: myristic aldehyde cyanhydrin. $\text{C}_{15}\text{H}_{29}\text{ON}$. MW, 239. Plates from pet. ether. M.p. 50.5°. Sol. EtOH, Et_2O , CHCl_3 , C_6H_6 .

Le Sueur, *J. Chem. Soc.*, 1905, 87, 1899.

Asahina, Asano, *Journal of the Pharmaceutical Society, Japan*, 1927, 539, 1.

10-Hydroxypentadecylic Acid



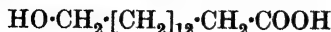
$\text{C}_{15}\text{H}_{30}\text{O}_3$ MW, 258

Cryst. from AcOEt. M.p. 63.5–64°.

Me ester: $C_{15}H_{32}O_3$. MW, 272. M.p. 29–32°. B.p. 166°/2 mm.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, 50, 1754.

15-Hydroxypentadecylic Acid



$C_{15}H_{30}O_3$ MW, 258

Obtained by saponification of musk-seed oil. Plates from Et_2O . M.p. 82–4°. Sol. EtOH, AcOEt, Me_2CO , C_6H_6 . Spar. sol. pet. ether. Insol. H_2O . Ox. \rightarrow tridecane-1 : 13-dicarboxylic acid.

Lactone: exaltolide. $C_{15}H_{28}O_2$. MW, 240. M.p. 31–2°. B.p. 176°/15 mm. D_4^{25} 0.9383. n_D^{25} 1.4633.

Acetyl: cryst. from pet. ether. M.p. 59°.

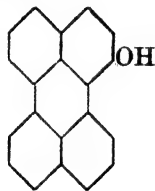
Ruzicka, Stoll, *Helv. Chim. Acta*, 1928, 11, 1167.

Kerschbaum, *Ber.*, 1927, 60, 908.

Hydroxypentamethoxyisoflavone.

See under Iridogenin.

Hydroxyperylene



$C_{20}H_{12}O$ MW, 268

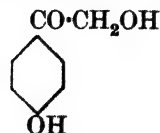
Yellow needles from EtOH.Aq. M.p. 197°. Sol. usual org. solvents. Insol. H_2O . Sols. are yellow with green fluor. Sol. alkalis. Yellow sol. in conc. $H_2SO_4 \rightarrow$ green on heating.

Me ether: $C_{21}H_{14}O$. MW, 282. Yellow needles from MeOH. M.p. 111°.

Benzoyl: m.p. 170–1°.

Weitzenböck, Seer, *Ber.*, 1913, 46, 1997.

p-Hydroxyphenacyl Alcohol (4 : ω -Di-hydroxyacetophenone, p-hydroxybenzoylcarbinol, hydroxymethyl p-hydroxyphenyl ketone, p-glycollyl-phenol)



$C_8H_8O_3$ MW, 152

4-*Me ether*: p-methoxybenzoylcarbinol, anisoylcarbinol. $C_9H_{10}O_3$. MW, 166. Plates. M.p. 104° (100°). *Acetyl*: cryst. M.p. 59°. *Phenyl ether*: phenyl p-methoxyphenacyl ether.

$C_{15}H_{14}O_3$. MW, 242. Cryst. M.p. 67°. B.p. 230–3°/20 mm. Ox. \rightarrow anisic acid. *Oxime of phenyl ether*: needles from EtOH. M.p. 105°.

4-*Et ether*: p-ethoxybenzoylcarbinol. $C_{10}H_{12}O_3$. MW, 180. *Phenyl ether*: phenyl p-ethoxyphenacyl ether. $C_{16}H_{16}O_3$. MW, 256. Needles. M.p. 102°. B.p. 245–8°/25 mm. *Oxime of phenyl ether*: needles. M.p. 116°.

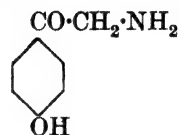
Stoermer, Atenstädt, *Ber.*, 1902, 35, 3565.

Tiffeneau, *Compt. rend.*, 1910, 150, 1182.

Boeseken, Hansen, Bertram, *Rec. trav. chim.*, 1916, 35, 312.

Kondo, Nakagawa, *Journal of the Pharmaceutical Society, Japan*, 1930, 50, 928.

p-Hydroxyphenacylamine (p-Hydroxy- ω -aminoacetophenone)



$C_8H_9O_2N$ MW, 151

Plates from EtOH. M.p. 190–3° decomp. Spar. sol. H_2O , EtOH, AcOH. Insol. $CHCl_3$, Et_2O . Sol. acids and alkalis.

Me ether: p-methoxyphenacylamine. $C_9H_{11}O_2N$. MW, 165. *B,HCl*: prisms from EtOH. M.p. 204° decomp. $B_2H_2SO_4$: m.p. 168°. $B_2H_2PtCl_6$: yellow plates. M.p. 225–8° decomp. *Picrate*: m.p. 185° decomp. *N-Benzyl*: m.p. 118°. *N-Di-Me*: $C_{11}H_{15}O_2N$. MW, 193. Oil which slowly solidifies. M.p. about 30°.

N-Di-Me: $C_{10}H_{13}O_2N$. MW, 179. Prisms from Et_2O -ligroin. M.p. 142°. Spar. sol. Et_2O . *B,Hl*: needles. M.p. 176°.

B,HCl: prisms from EtOH. M.p. 245° decomp. Sol. H_2O . Spar. sol. EtOH.

Picrate: needles. M.p. 192°.

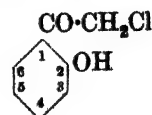
Tutin, *J. Chem. Soc.*, 1910, 97, 2520.

Mannich, Hahn, *Ber.*, 1911, 44, 1547.

Voswinckel, *Ber.*, 1912, 45, 1005; D.R.P., 248,385.

Thiele, *Arch. Pharm.*, 1915, 253, 193.

o-Hydroxyphenacyl chloride (ω -Chloro-2-hydroxyacetophenone, 2-chloroacetylphenol, chloromethyl 2-hydroxyphenyl ketone)



$C_8H_7O_2Cl$

MW, 158.5

Red needles from EtOH. M.p. 73–4° (101°). Sol. most org. solvents. Volatile in steam. $\text{CH}_3\text{COONa.Aq.} \rightarrow$ coumaranone.

Me ether: 2-chloroacetylanisole. $\text{C}_9\text{H}_9\text{O}_2\text{Cl}$. MW, 172.5. Plates from EtOH. M.p. 68–9°. Volatile in steam. Lachrymatory. KOH fusion \rightarrow salicylic acid.

Tutin, *J. Chem. Soc.*, 1910, **97**, 2504.

Auwers, *Ber.*, 1926, **59**, 2899.

p-Hydroxyphenacyl chloride (ω -Chloro-4-hydroxyacetophenone, 4-chloroacetylphenol, chloromethyl 4-hydroxyphenyl ketone).

Yellowish-red leaflets from MeOH. M.p. 148° (102°). Sol. EtOH, MeOH.

Me ether: 4-chloroacetylanisole. $\text{C}_9\text{H}_9\text{O}_2\text{Cl}$. MW, 172.5. Needles from EtOH. M.p. 105°. Lachrymatory.

Et ether: 4-chloroacetylphenetole. $\text{C}_{10}\text{H}_{11}\text{O}_2\text{Cl}$. MW, 186.5. Red needles from EtOH. M.p. 107°. Sol. EtOH, Et_2O , CHCl_3 .

Acetyl: prisms from EtOH. M.p. 111° (90°).

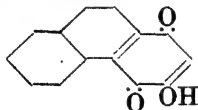
Tutin, Caton, Hann, *J. Chem. Soc.*, 1909, **95**, 2117.

See also last reference above.

ω -p-Hydroxyphenacyltoluene.

See p-Hydroxy- γ -phenylpropionophenone.

3-Hydroxy-1 : 4-phenanthraquinone



$\text{C}_{14}\text{H}_8\text{O}_3$

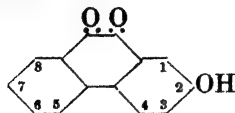
MW, 228

Orange-yellow needles from AcOH.Aq. Sinters at 200°, m.p. 230°. Sol. EtOH, AcOH, C_6H_6 . Spar. sol. H_2O . Sol. conc. H_2SO_4 to brownish-red sol. Red sols. in alkalis.

Me ether: $\text{C}_{15}\text{H}_{10}\text{O}_3$. MW, 242. Yellow needles from C_6H_6 -ligroin. M.p. 170°.

Fieser, *J. Am. Chem. Soc.*, 1929, **51**, 949.

2-Hydroxyphenanthraquinone



$\text{C}_{14}\text{H}_8\text{O}_3$

MW, 228

Violet needles from AcOH. M.p. 280–3°. Sublimes. Sol. in a little KOH.Aq. \rightarrow blue, in excess \rightarrow deep green.

Me ether: $\text{C}_{15}\text{H}_{10}\text{O}_3$. MW, 242. Deep red needles from AcOH. M.p. 170–1°. Sol. EtOH, AcOH. Spar. sol. H_2O . Soda-lime dist. \rightarrow 2-methoxyfluorene + 2-methoxyfluorenone.

Et ether: $\text{C}_{16}\text{H}_{12}\text{O}_3$. MW, 256. Red leaflets from AcOH. M.p. 160–1°. Sol. EtOH, AcOH.

Acetyl: reddish-yellow needles from AcOH. M.p. 215–16°. Sol. EtOH, Et_2O , Me_2CO .

Benzoyl: red needles from C_6H_6 . M.p. 240–2°. Sol. EtOH, AcOH. Spar. sol. C_6H_6 .

Semicarbazone: brown cryst. from EtOH. M.p. 263–5° decomp.

Werner, *Ann.*, 1902, **322**, 159.

Anschütz, Meyer, *Ber.*, 1885, **18**, 1943.

3-Hydroxyphenanthraquinone.

Yellowish-red needles from MeOH. M.p. 330° decomp. Sublimes.

Me ether: orange-red needles from AcOH. M.p. 205° (208°).

Et ether: orange-yellow needles from EtOH. M.p. 207–8°. *Oxime*: yellowish-green leaflets from EtOH. M.p. 174°. Sol. CHCl_3 . Spar. sol. EtOH, Et_2O .

Acetyl: golden-yellow needles from AcOH. M.p. 199–201° (206°). *Hydrazone*: red needles from AcOH. M.p. 207–9°. Sol. most org. solvents.

Benzoyl: yellowish-red needles from AcOH. M.p. 224–6°. Sol. EtOH, AcOEt, AcOH, Me_2CO , C_6H_6 . Spar. sol. Et_2O .

Hydrazone: red needles from AcOH. M.p. 237–8°. Sol. EtOH, Et_2O , AcOEt, AcOH, C_6H_6 .

Werner, *Ann.*, 1902, **322**, 138.

Pschorr, *Ber.*, 1901, **34**, 4007.

Henstock, *J. Chem. Soc.*, 1906, **89**, 1530.

4-Hydroxyphenanthraquinone.

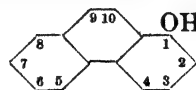
Red powder. M.p. 285°. Sol. AcOH, C_6H_6 . Spar. sol. MeOH, EtOH, Et_2O . Sol. conc. H_2SO_4 to brownish-green sol. Deep green sols. in alkalis. Reductive acetylation \rightarrow 1 : 3 : 4-triacetoxypheanthrene, m.p. 138°.

Acetyl: brown cryst. M.p. 188–9°.

Semicarbazone: brown cryst. from EtOH.Aq. M.p. 258° decomp.

Schmidt, Schairer, *Ber.*, 1911, **44**, 744.

1-Hydroxyphenanthrene (1-Phenanthrol)



$\text{C}_{14}\text{H}_{10}\text{O}$

MW, 194

Needles from Et_2O . M.p. 156°. Red sol. in H_2SO_4 .

Acetyl: needles from EtOH or C_6H_6 . M.p. 135–6°.

Me ether: $\text{C}_{15}\text{H}_{12}\text{O}$. MW, 208. Needles from MeOH. M.p. 105°. *Picrate*: m.p. 154°.

2-Hydroxyphenanthrene

Picrate: orange-red needles from MeOH. M.p. 182°.

Fieser, *J. Am. Chem. Soc.*, 1929, **51**, 2464.

2-Hydroxyphenanthrene (2-Phenanthrol).

Plates from EtOH or ligroin. M.p. 168°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. ligroin.

Acetyl: cryst. M.p. 142-3°. Sol. EtOH, Et₂O, C₆H₆, AcOH.

Benzoyl: cryst. from EtOH. M.p. 139-40°.

Me ether: plates from EtOH or Me₂CO. M.p. 99° (100-1°). Sol. Me₂CO, Et₂O, AcOH, EtOH, ligroin. Sols. fluoresce blue. *Picrate*: orange needles from EtOH. M.p. 124°.

Et ether: C₁₆H₁₄O. MW, 222. Plates from AcOH. M.p. 112°. Very sol. Et₂O, CHCl₃, C₆H₆, pet. ether. Sol. EtOH, AcOH.

Picrate: red needles. M.p. 156°.

Werner, Rekner, *Ann.*, 1902, **321**, 306.

Pschorr, Klein, *Ber.*, 1901, **34**, 4003.

Henstock, *J. Chem. Soc.*, 1906, **89**, 1528.

3-Hydroxyphenanthrene (3-Phenanthrol).

Needles from EtOH or ligroin. M.p. 122-3° (118-19°). Sol. EtOH, Et₂O, C₆H₆, hot ligroin.

Acetyl: cryst. from EtOH.Aq. M.p. 114-15°. Sol. EtOH, Et₂O.

Me ether: plates from MeOH. M.p. 63° (59°). Sol. EtOH, Et₂O, ligroin, C₆H₆. *Picrate*: red needles from EtOH. M.p. 124-5°.

Et ether: white cryst. from MeOH. M.p. 46°.

Benzyl ether: C₂₁H₁₆O. MW, 284. Plates from EtOH.Aq. M.p. 115-16°. Sol. EtOH, Et₂O.

Picrate: red needles from EtOH. M.p. 124-5°.

Pschorr, Klein, *Ber.*, 1901, **34**, 4006.

Werner, *Ann.*, 1902, **321**, 282.

Pschorr, Sumuleanu, *Ber.*, 1900, **33**, 1821.

Werner, Kunz, *Ber.*, 1902, **35**, 4423.

4-Hydroxyphenanthrene (4-Phenanthrol).

Cryst. from pet. ether. M.p. 106-9°.

Acetyl: plates from EtOH. M.p. 58-9°.

Me ether: plates from MeOH. M.p. 68°.

Picrate: red needles. M.p. 187-8°.

Pschorr, Jackel, *Ber.*, 1900, **33**, 1827.

Behrend, Ludwig, *Ann.*, 1911, **379**, 359.

9-Hydroxyphenanthrene (9-Phenanthrol).

Needles from ligroin or C₆H₆. M.p. 148-9° (152-3°). Very sol. EtOH, Et₂O, CHCl₃, C₆H₆. Sol. ligroin. Spar. sol. H₂O. Oxidises in air.

Acetyl: needles from ligroin or EtOH.Aq. M.p. 77-8°.

Propionyl: needles from AcOH. M.p. 95°.

Me ether: needles from MeOH. M.p. 98-7°.

308 2-Hydroxyphenanthrene-9-carboxylic Acid

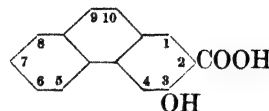
Picrate: red needles. M.p. 185°.

Japp, Findlay, *J. Chem. Soc.*, 1897, **71**, 1122.

Schmidt, Lumpp, *Ber.*, 1908, **41**, 4222.

Werner, Frey, *Ann.*, 1902, **321**, 299.

3-Hydroxyphenanthrene-2-carboxylic Acid (3-Phenanthrol-2-carboxylic acid)



C₁₅H₁₀O₃

MW, 238

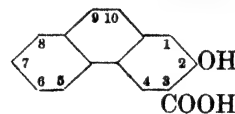
Yellow prisms from Me₂CO-xylene. M.p. 303° decomp. Sol. Me₂CO. Spar. sol. EtOH, xylene. Insol. ligroin.

Me ester: C₁₆H₁₂O₃. MW, 252. Yellow needles from EtOH. M.p. 171°. Sol. EtOH, C₆H₆. Spar. sol. ligroin.

Acetyl: needles from EtOH or Me₂CO. M.p. 207-8°. Insol. xylene.

Werner, Kunz, *Ber.*, 1902, **35**, 4424.

2-Hydroxyphenanthrene-3-carboxylic Acid (2-Phenanthrol-3-carboxylic acid)



C₁₆H₁₀O₃

MW, 238

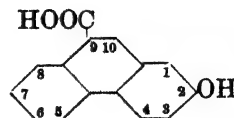
Yellow needles from Me₂CO-C₆H₆. M.p. 277° decomp. Sol. Me₂CO. Mod. sol. EtOH, C₆H₆. Spar. sol. hot H₂O, ligroin.

Me ester: C₁₆H₁₂O₃. MW, 252. Brown needles from EtOH, Et₂O, or Me₂CO. M.p. 126°. Spar. sol. ligroin.

Acetyl: brown needles from EtOH or Me₂CO. M.p. 210° decomp. Spar. sol. hot AcOH. Insol. ligroin.

Werner, Kunz, *Ber.*, 1902, **35**, 4425.

2-Hydroxyphenanthrene-9-carboxylic Acid (2-Phenanthrol-9-carboxylic acid)



C₁₆H₁₀O₃

MW, 238

Yellowish-brown cryst. from EtOH or AcOH. M.p. 278°.

Me ether: C₁₆H₁₂O₃. MW, 252. Prisms from EtOH. M.p. 228°. Sol. EtOH, MeOH,

4-Hydroxyphenanthrene-9-carboxylic Acid

AcOH, AcOEt, PhNO₂. Mod. sol. C₆H₆, CHCl₃. Spar. sol. ligroin.

Acetyl: plates from AcOH. Aq. M.p. 223°.

Pschorr, *Ber.*, 1906, **39**, 3123.

4-Hydroxyphenanthrene-9-carboxylic Acid (4-Phenanthrol-9-carboxylic acid).

Me ether: needles from toluene. M.p. 224° Sol. Me₂CO. Spar. sol. EtOH, Et₂O, AcOH, toluene. Dist. in vacuo → 4-methoxyphenanthrene.

Pschorr, Jaeckel, *Ber.*, 1900, **33**, 1827.

6-Hydroxyphenanthrene-9-carboxylic Acid (6-Phenanthrol-9-carboxylic acid, 3-phenanthrol-10-carboxylic acid).

Me ether: needles from EtOH. M.p. 239° Sol. AcOH. Mod. sol. EtOH.

Et ether: C₁₇H₁₄O₃. MW, 266. Plates from EtOH. M.p. 206°. CrO₃ in AcOH → 3-ethoxyphenanthraquinone.

Pschorr, Wolfes, Buckow, *Ber.*, 1900, **33**, 174.

Werner, *Ann.*, 1902, **322**, 154.

8-Hydroxyphenanthrene-9-carboxylic Acid (8-Phenanthrol-9-carboxylic acid, 1-phenanthrol-10-carboxylic acid).

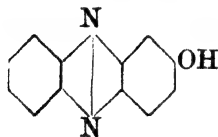
Me ether: yellow plates from EtOH. M.p. 215°. Sol. usual org. solvents. Spar. sol. pet. ether.

Pschorr, Wolfes, Buckow, *Ber.*, 1900, **33**, 169.

1-Hydroxyphenazine.

See Hemipyocyanine.

2-Hydroxyphenazine (2-Phenazinol)



C₁₂H₈ON₂

MW, 196

Dark red cryst. + 1H₂O from EtOH. At 110° → yellow anhyd. comp., m.p. 253-4° decomp. Yellowish-red sols. in alkalis. Conc. H₂SO₄ → dichroic sol. which is olive-green in thin, and red in thick layers: addn. of H₂O → golden-yellow col.

Me ether: C₁₃H₁₀ON₂. MW, 210. Yellow needles from H₂O. M.p. 126°. Spar. volatile in steam. B₂H₂PtCl₆: orange plates. De-comp. above 250°.

o-Hydroxyphenylacetic Acid

Acetyl: yellow cryst. from EtOH or C₆H₆. M.p. 152°. Sol. AcOH. Insol. H₂O.

Kehrmann, Cherpillod, *Helv. Chim. Acta*, 1924, **7**, 974.

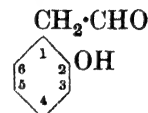
Kehrmann, Mermoud, *Helv. Chim. Acta*, 1927, **10**, 65.

McCombie, Scarborough, Waters, *J. Chem. Soc.*, 1928, 356.

o-Hydroxyphenoxycetophenone.

See o-Hydroxyphenyl phenacyl Ether.

o-Hydroxyphenylacetaldehyde (o-Hydroxy-α-toluic aldehyde, homosalicylaldehyde, ω-aldehydo-o-cresol)



C₈H₈O₂

MW, 136

Colourless liq. B.p. about 90° in vacuo. Yellow sol. in dil. NaOH.

Semicarbazone: cryst. from EtOH. M.p. 171°.

p-Nitrophenylhydrazone: cryst. from EtOH. M.p. 148°.

Me ether: o-methoxyphenylacetaldehyde. C₉H₁₀O₂. MW, 150. B.p. 115-17°/17 mm. Reduces NH₃.AgNO₃. Polymerises slowly in air. *Acetyl*: b.p. 238.5-9°/757 mm., 117-18°/15 mm. *Oxime*: needles. M.p. 94-5°. *Semicarbazone*: needles from EtOH. M.p. 158-9°.

Weerman, *Rec. trav. chim.*, 1917, **37**, 7.

Rinkes, *Rec. trav. chim.*, 1926, **45**, 823.

m-Hydroxyphenylacetaldehyde (m-Hydroxy-α-toluic aldehyde, ω-aldehydo-m-cresol).

Me ether: m-methoxyphenylacetaldehyde. *Oxime*: white needles from H₂O or ligroin. M.p. 92.5° (91°).

Gulland, Virden, *J. Chem. Soc.*, 1929, 1796.

p-Hydroxyphenylacetaldehyde (p-Hydroxy-α-toluic aldehyde, ω-aldehydo-p-cresol).

Cryst. Non-volatile in steam. Reduces Fehling's in the cold.

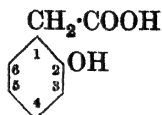
p-Nitrophenylhydrazone: yellow cryst. from EtOH. M.p. 158°.

Me ether: see Homoanisaldehyde.

Langheld, *Ber.*, 1909, **42**, 2372.

Tiffeneau, *Ann. chim.*, 1907, **10**, 350.

o-Hydroxyphenylacetic Acid (2-Hydroxy-α-toluic acid)



C₈H₈O₃

MW, 152

Needles from Et₂O, prisms from CHCl₃. M.p. 145–7° (137°). B.p. 240–3° → lactone. Sol. Et₂O. Spar. sol. H₂O, CHCl₃. FeCl₃ → violet col.

Me ether: o-methoxyphenylacetic acid. C₉H₁₀O₃. MW, 166. Needles from H₂O. M.p. 123–4°. Sol. EtOH, Et₂O, Me₂CO, AcOH, CHCl₃, hot C₆H₆. *Nitrile*: C₉H₉ON. MW, 147. Prisms from C₆H₆-ligroin. M.p. 68°. B.p. 141–3°/15 mm.

Et ether: o-ethoxyphenylacetic acid. C₁₀H₁₂O₃. MW, 180. Needles from ligroin. M.p. 103–4°. Spar. sol. H₂O. *Nitrile*: C₁₀H₁₁ON. MW, 161. B.p. 135–40°/16 mm.

Lactone: see Isocoumaranone.

Amide: C₈H₉O₂N. MW, 151. Leaflets from EtOH-CHCl₃. M.p. 116–18°. *Benzoyl*: leaflets from EtOH. M.p. 162–4°. Sol. Et₂O, AcOH. Spar. sol. EtOH, C₆H₆, ligroin. Insol. alkalis.

Nitrile: o-hydroxybenzyl cyanide. C₈H₇ON. MW, 133. Needles from C₆H₆-ligroin. M.p. 117–19°. Sol. most org. solvents. *Benzoyl*: needles from ligroin. M.p. 50°.

Hydrazone: leaflets from CHCl₃. M.p. 154°.

Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, 42, 828.

Stoermer, *Ann.*, 1900, 313, 83.

Auwers, *Ber.*, 1907, 40, 3512.

Pschorr, Zeidler, *Ann.*, 1910, 373, 76.

m-Hydroxyphenylacetic Acid (3-Hydroxy- α -toluic acid).

Needles from C₆H₆-ligroin. M.p. 129°. Sol. H₂O, EtOH, Et₂O. FeCl₃ → green col.

Me ether: m-methoxyphenylacetic acid. C₉H₁₀O₃. MW, 166. Leaflets from H₂O. M.p. 67°. *Et ester*: C₁₁H₁₄O₃. MW, 194. B.p. 146–7°/14 mm.

Nitrile: m-hydroxybenzyl cyanide. C₈H₇ON. MW, 133. Plates from H₂O. M.p. 52–3°. Sol. H₂O, EtOH, Et₂O. FeCl₃ → violet col.

Salkowski, *Ber.*, 1884, 17, 506.

v. Pechmann, Bauer, Obermiller, *Ber.*, 1904, 37, 2121.

Pschorr, *Ann.*, 1912, 391, 45.

Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, 42, 831.

p-Hydroxyphenylacetic Acid (4-Hydroxy- α -toluic acid).

Occurs in human and canine urine, dandelion roots, etc. Also produced by bacteriological putrefaction. Needles from H₂O. M.p. 148–50°. Sol. EtOH, Et₂O, hot H₂O. FeCl₃ → weak greenish-violet col. Ba and Ca salts spar. sol. H₂O. Dry dist. → p-cresol.

Me ether: see Homoanisic Acid.

Et ether: p-ethoxyphenylacetic acid. C₁₀H₁₂O₃. MW, 180. Leaflets from H₂O. M.p. 88–9°. Spar. sol. cold H₂O. *Amide*: C₁₀H₁₃O₂N. MW, 179. Leaflets from H₂O. M.p. 184°. Sol. EtOH, Me₂CO, AcOH. Spar. sol. Et₂O, C₆H₆, ligroin. *Nitrile*: C₁₀H₁₁ON. MW, 161. Leaflets from EtOH.Aq. M.p. 47°. *Me ester*: C₉H₁₀O₃. MW, 166. B.p. 310°. D₂₀²⁵ 1.1786. n_D²⁰ 1.5338.

Et ester: C₁₀H₁₂O₃. MW, 180. B.p. 314°. D₁₈²⁵ 1.2225. n_D²⁰ 1.5183.

Amide: C₉H₉O₂N. MW, 151. Leaflets from H₂O. M.p. 175°. *Benzoyl*: cryst. from EtOH. M.p. 167–9°.

Nitrile: p-hydroxybenzyl cyanide. C₈H₇ON. MW, 133. Needles from H₂O. M.p. 69–7°. B.p. 330°. Sol. EtOH, Et₂O. Spar. sol. H₂O. FeCl₃ → violet col.

Salkowski, *Ber.*, 1889, 22, 2137.

Pschorr, Wolfes, Buckow, *Ber.*, 1900, 33, 171.

Werner, *Ann.*, 1902, 322, 148.

Cain, Simonsen, Smith, *J. Chem. Soc.*, 1913, 103, 1036.

Hirai, *Biochem. Z.*, 1921, 114, 71.

See also last reference above.

α -Hydroxyphenylacetic Acid.

See Mandelic Acid.

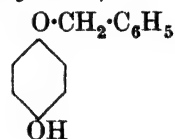
N-Hydroxyphenyl-anthranilic Acid.

See 2', 3', and 4'-Hydroxydiphenylamine-2 carboxylic Acids.

Hydroxyphenyl-benzoylthane.

See Hydroxyphenylpropiophenone.

p-Hydroxyphenyl benzyl Ether (Hydroquinone monobenzyl ether)



C₁₃H₁₂O₂ MW, 200

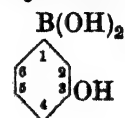
Plates from H₂O. M.p. 122–122.5°. Sol. EtOH, Et₂O, C₆H₆, hot H₂O. Spar. sol. cold H₂O.

Schiff, Pellizzari, *Ann.*, 1883, 221, 370.

Hydroxyphenyl benzyl Ketone.

See Hydroxydeoxybenzoin.

3-Hydroxyphenylboric Acid



C₆H₇O₃B

MW, 138

Cryst. from ethylene chloride-Me₂CO. M.p. 225° decomp. Sol. H₂O, EtOH, Et₂O, Me₂CO. Spar. sol. CHCl₃, ethylene chloride. FeCl₃ → bluish-violet col.

Bean, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 4421.

4-Hydroxyphenylboric Acid.

Me ether: C₇H₉O₃B. MW, 152. Plates from H₂O. M.p. 208.5–209.5° (207°).

König, Scharnbeck, *J. prakt. Chem.*, 1930, **128**, 157.

Bean, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 4417.

4-Hydroxy-4-phenylbutylene-1.

See Allylphenylcarbinol.

1-Hydroxy-1-phenylbutyric Acid (*Propyl-phenylglycollic acid*)

$$\text{C}_6\text{H}_5$$

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{C}(\text{OH}) \cdot \text{COOH}$$

 C₁₀H₁₂O₃ MW, 180
dl.

Needles from H₂O. M.p. 132.5°. Sol. EtOH, hot H₂O. Insol. ligroin.

Et ester: C₁₂H₁₆O₃. MW, 208. B.p. 143°/20 mm.

Grignard, *Compt. rend.*, 1902, **135**, 629.

Smith, *J. prakt. Chem.*, 1911, **84**, 744.

2-Hydroxy-2-phenylbutyric Acid (*β-Hydroxy-β-methylhydrocinnamic acid*)

$$\text{C}_6\text{H}_5$$

$$\text{CH}_3 \cdot \text{C}(\text{OH}) \cdot \text{CH}_2 \cdot \text{COOH}$$

 C₁₀H₁₂O₃ MW, 180

Needles. M.p. 50–3°.

Me ester: C₁₁H₁₄O₃. MW, 194. B.p. 135–40°/12 mm.

Et ester: C₁₂H₁₆O₃. MW, 208. B.p. 146–7°/15 mm.

Lindenbaum, *Ber.*, 1917, **50**, 1271.

Auwers, *Ann.*, 1917, **413**, 272.

1-Hydroxy-3-phenylbutyric Acid (*2-Benzyl-lactic acid*)

$$\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}(\text{OH}) \cdot \text{COOH}$$

 C₁₀H₁₂O₃ MW, 180
d.

Needles from C₆H₆. M.p. 114°. Sublimes. [α]_D²⁰ + 12.9°.

l.

M.p. 114–16°. [α]_D²⁷ – 9.9°.

Me ester: C₁₁H₁₄O₃. MW, 194. B.p. 159°/17 mm. [α]_D²⁵ – 22.3°.

1-Menthyl ester: C₂₀H₃₀O₃. MW, 318. M.p. 88°. [α]_D²⁵ – 65.4°.

dl.

Plates from Et₂O-ligroin. M.p. 104.5–105°. Sol. Et₂O. Spar. sol. C₆H₆, CS₂. Insol. ligroin.

Me ester: b.p. 155°/13 mm.

Biquard, *Ann. chim.*, 1933, **20**, 143.

Knoop, Kertess, *Z. physiol. Chem.*, 1911, **71**, 256, 259.

Fittig, Petkov, *Ann.*, 1898, **299**, 32.

2-Hydroxy-3-phenylbutyric Acid (*2-Benzylhydracrylic acid*)

$$\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \text{CH}(\text{OH}) \cdot \text{CH}_2 \cdot \text{COOH}$$

 C₁₀H₁₂O₃ MW, 180
dl.

Plates from Et₂O. Sol. cold H₂O, CHCl₃. Spar. sol. C₆H₆, ligroin, CS₂.

Fittig, Luib, *Ann.*, 1894, **283**, 297, 302, 305.

3-Hydroxy-3-phenylbutyric Acid

$$\text{C}_6\text{H}_5 \cdot \text{CH}(\text{OH}) \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{COOH}$$

 C₁₀H₁₂O₃ MW, 180
dl.

Cryst. from EtOH or CS₂. M.p. 75°. Sol. EtOH, Et₂O, CS₂, NaOH. H₂O at 65–80° → lactone. Ox. → 2-benzoylpropionic acid. Red. → 3-phenylbutyric acid.

Et ester: C₁₂H₁₆O₃. MW, 208. B.p. 158–160°/17 mm., 152–3°/12 mm.

Amide: C₁₀H₁₃O₂N. MW, 179. Prisms from EtOH. M.p. 86°. Sol. EtOH, hot H₂O, CHCl₃. Spar. sol. Et₂O.

Lactone: 3-phenylbutyrolactone. C₁₀H₁₀O₃. MW, 162. Needles from EtOH. M.p. 38°. B.p. 306°, 123°/2 mm. Sol. EtOH, Et₂O, C₆H₆, AcOH. Spar. sol. hot H₂O. *n*_D^{15.4} 1.5418. Volatile in steam.

l.

Occurs in urine.

Na salt: [α]_D¹⁸ – 13.0 in H₂O.

Fittig, Jayne, *Ann.*, 1883, **216**, 105.

Findlay, Hickmans, *J. Chem. Soc.*, 1909, **95**, 1009.

v. Peckmann, *Ber.*, 1882, **15**, 890.

2-Hydroxy-2-phenyl-*n*-caproic Acid (*β-Hydroxy-β-propylhydrocinnamic acid*)

$$\text{C}_6\text{H}_5$$

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{C}(\text{OH}) \cdot \text{CH}_2 \cdot \text{COOH}$$

 C₁₂H₁₆O₃ MW, 208

Cryst. from 60% EtOH or C_6H_6 . M.p. 121–122°. Decomp. at 150°. Conc. $H_2SO_4 \rightarrow \beta$ -propylcinnamic acid.

Schroeter, *Ber.*, 1908, **41**, 11.

3-Hydroxy-2-phenyl-*n*-caproic Acid (β -1-Hydroxypropylhydrocinnamic acid)

C_6H_5
 $CH_3 \cdot CH_2 \cdot CH(OH) \cdot CH \cdot CH_2 \cdot COOH$
 $C_{12}H_{16}O_3$ MW, 208
 M.p. 155–6°.

Ivanoff, Nicoloff, *Bull. soc. chim.*, 1932, **51**, 1325.

4-Hydroxy-2-phenyl-*n*-caproic Acid (β -2-Hydroxypropylhydrocinnamic acid)

C_6H_5
 $CH_3 \cdot CH(OH) \cdot CH_2 \cdot CH \cdot CH_2 \cdot COOH$
 $C_{12}H_{16}O_3$ MW, 208

Lactone: 4-methyl-2-phenylbutyrolactone.
 $C_{12}H_{14}O_2$. MW, 190. Oil. B.p. 197–200°/19 mm. Sol. EtOH, hot H_2O .

Vorländer, Knötzsch, *Ann.*, 1897, **294**, 329.

Jacobs, Scott, *J. Biol. Chem.*, 1931, **93**, 139.

2-Hydroxy-2-phenylcaprylic Acid (β -Hydroxy- β -amylhydrocinnamic acid)

C_6H_5
 $CH_3 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot C(OH) \cdot CH_2 \cdot COOH$
 $C_{14}H_{20}O_3$ MW, 236
 Needles from pet. ether, dil. EtOH, or CS_2 .
 M.p. 79–80.5°.

Schroeter, *Ber.*, 1907, **40**, 1603.

Hydroxyphenylcarbamic Acid.

Ethyl Ester. See Hydroxyphenylurethane.

4-Hydroxy-2-phenylchroman.

See Flavanol.

Hydroxyphenylcinchoninic Acid.

See Isaphenic Acid.

Hydroxy-phenylcinnamic Acid.

See Hydroxystilbene- α -carboxylic Acid.

Hydroxyphenylcrotonic Acid.

See β -Methyl-*p*-coumaric Acid.

1-*p*-Hydroxyphenyl-2-dimethylamino-ethane.

See Hordenine.

Hydroxyphenylethyl Alcohol.

See Tyrosol.

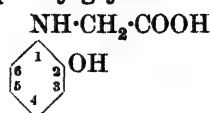
Hydroxyphenylethylamine.

See Tyramine.

Hydroxyphenylethylmethylamine.

See Methyl-hydroxyphenylethyl-amine.

***o*-Hydroxyphenylglycine**



$C_8H_9O_3N$ MW, 167
 Plates + $1H_2O$ from H_2O . Heat at 100–5° \rightarrow anhydride.

Me ether: $C_9H_{11}O_3N$. MW, 181. Needles from C_6H_6 . M.p. 153°. Sol. EtOH, Et_2O . Spar. sol. H_2O . *Amide*: $C_9H_{12}O_2N_2$. MW, 180. M.p. 153–4°. *Nitrile*: $C_9H_{10}ON_2$. MW, 162. Prisms. M.p. 68°.

Et ether: $C_{10}H_{13}O_3N$. MW, 195. Cryst. M.p. 120°. Sol. EtOH, Et_2O . Spar. sol. H_2O . *Amide*: $C_{10}H_{14}O_2N_2$. MW, 194. M.p. 161–2°.

Nitrile: $C_8H_8ON_2$. MW, 148. *N-Acetyl*: m.p. 167–8°. *Diacetyl*: m.p. 105–6°.

N-Acetyl: m.p. 201–2°.

Vater, *J. prakt. Chem.*, 1884, **29**, 289.

Shimo, *Bull. Chem. Soc. Japan*, 1926, **1**, 226.

***p*-Hydroxyphenylglycine.**

Plates from H_2O . Decomp. at 200° without melting. Spar. sol. H_2O , EtOH. Insol. Et_2O . $FeCl_3 \rightarrow$ blue col.

Me ether: cryst. M.p. 200° decomp. Sol. EtOH. Spar. sol. cold H_2O , Et_2O . *Amide*: m.p. 145–6°.

Et ether: cryst. from H_2O . M.p. 163°. *Amide*: m.p. 145–6°.

Me ester: $C_9H_{11}O_3N$. MW, 181. M.p. 97–8°.

Et ester: $C_{10}H_{13}O_3N$. MW, 195. Plates. M.p. 79°. Sol. EtOH, hot H_2O .

Amide: $C_8H_{10}O_2N_2$. MW, 166. M.p. 135–6°. *N-Acetyl*: m.p. 203–4°.

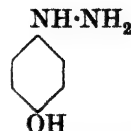
Diacetyl: m.p. 174–5°.

Meldola, Foster, Brightman, *J. Chem. Soc.*, 1917, **111**, 552.

Vater, *J. prakt. Chem.*, 1884, **29**, 294.

Bischoff, Nastvogel, *Ber.*, 1889, **22**, 1788.

***p*-Hydroxyphenylhydrazine** (*p*-Hydrazinophenol)



$C_8H_9ON_2$ MW, 124

Me ether: *p*-hydrazinoanisole. $C_7H_{10}ON_2$. MW, 138. Cryst. M.p. 65°. *N-Acetyl*: m.p. 133–5°.

Et ether: *p*-hydrazinophenetole. $C_9H_{12}ON_2$. MW, 152. Plates from C_6H_6 . M.p. 74° . Sol. H_2O , EtOH. Spar. sol. Et_2O , ligroin.

Altschul, *J. prakt. Chem.*, 1898, **57**, 202;
Ber., 1892, **25**, 1849.

1-Hydroxy-1-phenylisobutane.

See Isopropylphenylcarbinol.

1-Hydroxy-2-phenylisobutyric Acid (1-Benzyl-lactic acid, methylbenzylglycollic acid, α -hydroxy- α -methylhydrocinnamic acid)

$C_6H_5 \cdot CH_2 \cdot \overset{\overset{CH_3}{|}}{C(OH)} \cdot COOH$

$C_{10}H_{12}O_3$ MW, 180
Prisms from C_6H_6 . M.p. $97-9^\circ$. Sol. H_2O , C_6H_6 , EtOH.

Gabriel, Michael, *Ber.*, 1879, **12**, 815.

2-Hydroxy-2-phenylisobutyric Acid (β -Hydroxy- α -methylhydrocinnamic acid, 1-methyl-2-phenylhydracrylic acid)

$C_6H_5 \cdot CH(OH) \cdot \overset{\overset{CH_3}{|}}{C} \cdot COOH$

$C_{10}H_{12}O_3$ MW, 180
Needles from C_6H_6 -ligroin. M.p. 95° . Sol. EtOH, Et_2O , Me_2CO . Spar. sol. H_2O , $CHCl_3$, CS_2 , ligroin. $k = 3.47 \times 10^{-5}$ at 25° . CH_3COCl or $Ac_2O \rightarrow \alpha$ -methylcinnamic acid.

Perkin, Colman, *J. Chem. Soc.*, 1887, **49**, 159.

Perkin, Stenhouse, *J. Chem. Soc.*, 1891, **59**, 1010 (footnote).

Posner, *Ann.*, 1912, **389**, 75.

Dain, *J. Russ. Phys.-Chem. Soc.*, 1897, **29**, 597.

2-Hydroxy-1-phenylisopentane.

See Methyl-ethylbenzylcarbinol.

Hydroxyphenyl-isopropyl Alcohol.

See 2-, and 3-, α -Hydroxyisopropylphenol.

1-Hydroxy-phenylisoquinoline.

See Phenylisocarbostyryl.

***o*-Hydroxyphenyl phenacyl Ether** (*o*-Hydroxyphenoxyacetophenone, catechol phenacyl ether, phenacyl alcohol catechol ether)

$\text{OH} \quad \text{O} \cdot CH_2 \cdot CO \cdot C_6H_5$

$C_{14}H_{12}O_3$ MW, 228
Needles from C_6H_6 . M.p. 111° . Very sol. $MeOH$, EtOH, Et_2O , $CHCl_3$. Sol. C_6H_6 . Spar. sol. ligroin, H_2O .

Me ether: guaiacol phenacyl ether. $C_{15}H_{14}O_3$. MW, 242. Needles from Et_2O . M.p. 101° .

Et ether: $C_{16}H_{16}O_3$. MW, 256. Plates from EtOH. M.p. 81° .

Benzoyl: plates. M.p. $136-7^\circ$.

Oxime: needles from $MeOH$. Aq. M.p. 109° .

Hydrazone: yellow needles. M.p. 91° .

Semicarbazone: cryst. M.p. 145.5° .

Lazennec, *Bull. soc. chim.*, 1909, **5**, 501.

2-Hydroxy-1-phenylpropane.

See Methylbenzylcarbinol.

2-Hydroxy-2-phenylpropane.

See Dimethyl-phenylcarbinol.

2-Hydroxyphenylpropionic Acid

$C_6H_4 \cdot \overset{\overset{COOH}{|}}{C} \cdot CH_2 \cdot OH$

$C_9H_8O_3$ MW, 162

Me ether: $C_{10}H_8O_3$. MW, 176. Needles from CS_2 . M.p. $124-6^\circ$ decomp. Sol. EtOH, Et_2O .

Et ether: $C_{11}H_{10}O_3$. MW, 190. Needles from H_2O . M.p. $115.5-116^\circ$. Sol. EtOH, Et_2O . Spar. sol. cold H_2O . H_2O at $140-50^\circ \rightarrow$ 2-ethoxyphenylacetylene + 2-ethoxyacetophenone.

Fittig, Claus, *Ann.*, 1892, **269**, 7.

Michael, Lamb, *Am. Chem. J.*, 1906, **36**, 565.

4-Hydroxyphenylpropionic Acid.

Me ether: needles. M.p. $132-9^\circ$ decomp. Mod. sol. dil. EtOH. Spar. sol. H_2O .

Reychler, *Bull. soc. chim.*, 1897, **17**, 512.

Hydroxyphenylpropionic Acid.

See Atrolactic Acid, Tropic Acid, Hydroxyhydrocinnamic Acid, and Hydroxyhydratropic Acid.

***o*-Hydroxy-2-phenylpropionic Acid.**

See Melilotic Acid.

γ -[*o*-Hydroxyphenyl]-propiophenone (β -[*o*-Hydroxybenzyl]-acetophenone, 1-*o*-hydroxyphenyl-2-benzoylthane, ω -phenacyl-*o*-cresol)

$CH_2 \cdot CH_2 \cdot CO \cdot C_6H_5$

$C_{15}H_{14}O_2$ MW, 226
Leaflets. M.p. $91-2^\circ$.
Me ether: $C_{16}H_{16}O_2$. MW, 240. B.p. $223^\circ/20$ mm.
Acetyl: needles. M.p. $65-6^\circ$.

Semicarbazone: needles from C_6H_6 . M.p. 174–5°.

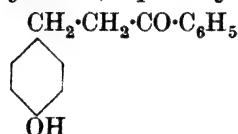
Borsche, Geyer, *Ber.*, 1914, **47**, 1160.

Bargellini, Bini, *Gazz. chim. ital.*, 1911, **41**, 441.

Feuerstein, Musculus, *Ber.*, 1901, **34**, 410.

Feuerstein, Kostanecki, *Ber.*, 1898, **31**, 718.

γ -[*p*-Hydroxyphenyl]-propiophenone (β -[*p*-Hydroxybenzyl]-acetophenone, 1-*p*-hydroxy-phenyl-2-benzoylthane, ω -phenacyl-*p*-cresol)



$C_{15}H_{14}O_2$ MW, 226

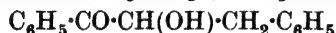
Me ether: ω -anisylacetophenone. $C_{15}H_{16}O_2$: MW, 240. Needles from EtOH.Aq. M.p. 68° (59–60°). Sol. EtOH, Et₂O, C_6H_6 . Spar. sol. H₂O, pet. ether. *Semicarbazone*: needles from EtOH.Aq. M.p. 118–20°.

Pfeiffer, Negreau, *Ber.*, 1917, **50**, 1473.

Kohler, Conant, *J. Am. Chem. Soc.*, 1917, **39**, 1709.

Bargellini, Bini, *Gazz. chim. ital.*, 1911, **41**, 443.

β -Hydroxy- γ -phenylpropiophenone (*Benzylbenzoylcarbinol*, β -hydroxy- β -benzylacetophenone)



$C_{15}H_{14}O_2$ MW, 226

dl.

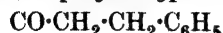
Needles from H₂O. M.p. 65–6°. Reduces Fehling's.

Active form:

Prisms from pet. ether. M.p. 75.5–76.5°. Sol. usual org. solvents. Spar. sol. H₂O. $[\alpha]_D^{17.5} + 12.6^\circ$ in Me₂CO, $[\alpha]_D^{21} - 19.3^\circ$ in EtOH. Reduces Fehling's. Racemised by NaOEt.

McKenzie, Martin, Rule, *J. Chem. Soc.*, 1914, 105, 1589.

p-Hydroxy- γ -phenylpropiophenone (*p*-Hydroxy- β -benzylacetophenone, 1-phenyl-2-*p*-hydroxybenzoylthane, ω -*p*-hydroxyphenacyltoluene)



$C_{15}H_{14}O_2$ MW, 226

Me ether: $C_{16}H_{16}O_2$. MW, 240. Plates from EtOH. M.p. 97°. Sol. Et₂O, AcOH. Insol.

H₂O. *Oxime*: needles from EtOH.Aq. M.p. 114°.

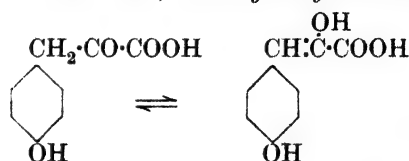
Jörlander, *Ber.*, 1917, **50**, 411.

Pfeiffer, Negreau, *Ber.*, 1917, **50**, 1474.

Hydroxyphenylpropyl Alcohol.

See Hydroxypropylphenol.

4-Hydroxyphenylpyruvic Acid (α -Hydroxy-*p*-coumaric acid, 4- α -dihydroxycinnamic acid)



$C_9H_8O_4$ MW, 180

Plates from H₂O. M.p. 220°. Sol. EtOH, Et₂O, AcOEt. Spar. sol. H₂O, C_6H_6 . Reduces Fehling's and NH₃.AgNO₃. FeCl₃ \rightarrow green col.

Me ether: $C_{10}H_{10}O_4$. MW, 194. Prisms from AcOEt. M.p. 186°. Sol. EtOH, C_6H_6 , CHCl₃. Spar. sol. ligroin. *Phenylhydrazones*: m.p. 154°. *Et ester*: $C_{12}H_{14}O_4$. MW, 222. B.p. 190°/15 mm. *Semicarbazone of Et ester*: cryst. M.p. 152–3°.

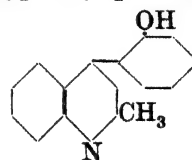
Neubauer, *Chem. Zentr.*, 1909, II, 50.

Erlenmeyer, Wittenberg, *Ann.*, 1904, **337**, 299.

Cain, Simonsen, *J. Chem. Soc.*, 1913, 103, 1036.

Neubauer, Fromherz, *Z. physiol. Chem.*, 1910, **70**, 339.

4-*o*-Hydroxyphenylquinaldine



$C_{16}H_{13}ON$ MW, 235

Needles from dil. EtOH. M.p. 187–8°.

Besthorn, Banzhaf, Jaeglé, *Ber.*, 1894, **27**, 3038.

M.L.B., D.R.P., 80,501.

4-*m*-Hydroxyphenylquinaldine.

M.p. 259–60°.

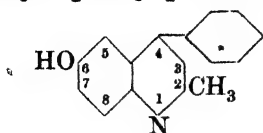
See second reference above.

4-*p*-Hydroxyphenylquinaldine.

Cryst. from EtOH. M.p. 255°.

Besthorn, Jaeglé, *Ber.*, 1894, **27**, 912.

M.L.B., D.R.P., 80,501.

6-Hydroxy-4-phenylquinaldine

$C_{16}H_{13}ON$ MW, 235
Cryst. from EtOH. M.p. 248°.
Me ether: $C_{17}H_{15}ON$. MW, 249. Plates from C_6H_6 . M.p. 78°.

Königs, Jaeglé, *Ber.*, 1895, **28**, 1048.

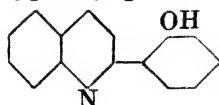
7-Hydroxy-4-phenylquinaldine.

Yellow needles. M.p. 262°. Sol. alkalis.
Et ether: $C_{18}H_{17}ON$. MW, 263. Needles. M.p. 91°.

$B_2H_2PtCl_6$: m.p. 218–20°.

Picrate: m.p. 208°.

Bülow, Issler, *Ber.*, 1903, **36**, 2453.

2-o-Hydroxyphenylquinoline

$C_{15}H_{11}ON$ MW, 221
Yellow needles from EtOH. M.p. 115°. B.p. above 300°. Sol. acids and alkalis.
Picrate: yellow needles. M.p. 184°.

Döbner, *Ann.*, 1888, **249**, 101.

2-m-Hydroxyphenylquinoline.

Needles from dil. EtOH. M.p. 156°. Sol. EtOH, Et_2O . Zn \rightarrow 2-phenylquinoline.

$B, HCl, \frac{1}{2}H_2O$: m.p. 224°. Spar. sol. H_2O .

Murmann, *Monatsh.*, 1892, **13**, 67.

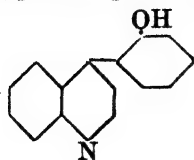
Miller, Kinkel, *Ber.*, 1885, **18**, 1908.

2-p-Hydroxyphenylquinoline.

Needles. M.p. 237–8°. Sol. hot EtOH, KOH, HCl. Insol. H_2O . Zn \rightarrow 2-phenylquinoline.

Murmann, *Monatsh.*, 1892, **13**, 63.

Weidel, *Monatsh.*, 1887, **8**, 127.

4-o-Hydroxyphenylquinoline

$C_{15}H_{11}ON$ MW, 221
M.p. 208°.
 B, HCl : m.p. 260°.
 $B_2H_2PtCl_6$: m.p. 274°.

Et ether: $C_{17}H_{15}ON$. MW, 249. M.p. 80–1°.
Picrate: m.p. 201–2°.

Besthorn, Banzhaf, Jaeglé, *Ber.*, 1894, **27**, 3040.

Königs, *J. prakt. Chem.*, 1900, **61**, 40.

4-m-Hydroxyphenylquinoline.

M.p. 235°. Spar. sol. EtOH, $CHCl_3$. Prac. insol. Et_2O . $CrO_3 \rightarrow$ cinchonic acid.

Koenigs, Nef, *Ber.*, 1887, **20**, 630.

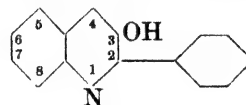
Besthorn, Banzhaf, Jaeglé, *Ber.*, 1894, **27**, 3041.

4-p-Hydroxyphenylquinoline.

Needles or prisms from dil. EtOH. M.p. 243°. Sol. EtOH, $CHCl_3$. Prac. insol. C_6H_6 , Et_2O . $CrO_3 \rightarrow$ cinchonic acid.

Koenigs, Nef, *Ber.*, 1887, **20**, 629.

Besthorn, Jaeglé, *Ber.*, 1894, **27**, 913.

3-Hydroxy-2-phenylquinoline

$C_{15}H_{11}ON$ MW, 221
M.p. 218–20° (210–12°). Sol. alkalis.
 B, HCl : m.p. 261° (243–5°).

Dilthey, Thelen, *Ber.*, 1925, **58**, 1589.

Barginelli, Berlingozzi, *Gazz. chim. ital.*, 1923, **53**, 3.

4-Hydroxy-2-phenylquinoline.

Plates from EtOH. M.p. 256°. Sol. alkalis, hot EtOH. Prac. insol. H_2O . Insol. Et_2O . Zn \rightarrow 2-phenylquinoline.

Me ether: $C_{16}H_{13}ON$. MW, 235. Needles from ligroin. M.p. 69–70°.

$B, HCl, \frac{1}{2}H_2O$: m.p. 234° decomp.

Just, *Ber.*, 1886, **19**, 1464.

Conrad, Limpach, *Ber.*, 1888, **21**, 521.

Niementowski, *Ber.*, 1894, **27**, 1396; *Ber.*, 1905, **38**, 2050.

Knorr, *Ann.*, 1888, **245**, 376.

Campo, *Arch. Pharm.*, 1901, **239**, 597.

Kaufmann, Pláy Janini, *Ber.*, 1911, **44**, 2677.

Dziewoński, Moszew, *Chem. Abstracts*, 1933, **27**, 3937.

6-Hydroxy-2-phenylquinoline.

Needles from dil. EtOH. M.p. 218°. Sol. EtOH, Et_2O . Insol. ligroin.

Me ether: plates from dil. EtOH. M.p. 133°.
Picrate: m.p. 205°.

Et ether: $C_{17}H_{15}ON$. MW, 249. M.p. 132°.

Picrate: needles from Et₂O. M.p. 201°.

Döbner, Fettback, *Ann.*, 1894, **281**, 14.

Schering, Chemische Fabrik auf Actien,
D.R.P., 312,098, (*Chem. Zentr.*, 1919,
II, 852).

7-Hydroxy-2-phenylquinoline.

Needles from dil. Me₂CO. M.p. 229–30°.
Mod. sol. EtOH, Me₂CO, AcOH. Spar. sol.
C₆H₆.

Borsche, *Ber.*, 1908, **41**, 3890.

8-Hydroxy-2-phenylquinoline.

Plates. M.p. 59°. Sol. EtOH, Et₂O, CHCl₃,
C₆H₆.

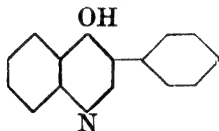
Picrate: yellow needles from dil. EtOH.
M.p. 152°.

Döbner, Fettback, *Ann.*, 1894, **281**, 9.

2-Hydroxy-3-phenylquinoline.

See 3-Phenylcarbostyryl.

4-Hydroxy-3-phenylquinoline



C₁₅H₁₁ON

MW, 221

Needles from EtOH. M.p. 255–7°.

Börner, *Chem. Zentr.*, 1900, I, 122.

Wislicenus, *Ann.*, 1917, **413**, 249.

2-Hydroxy-4-phenylquinoline.

See 4-Phenylcarbostyryl.

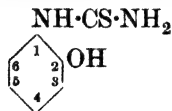
2-Hydroxy-3-phenylquinoline-4-carb- oxylic Acid.

See Isaphenic Acid.

Hydroxyphenyl styryl Ketone.

See 2', 3', and 4'-Hydroxychalkone.

2-Hydroxyphenylthiourea



C₇H₅ON₂S

MW, 168

Cryst. from H₂O. M.p. 161° decomp. Sol.
EtOH, Et₂O, alkalis. Mod. sol. hot H₂O.

Me ether: C₈H₁₀ON₂S. MW, 182. Needles
from EtOH. M.p. 152°.

Et ether: C₉H₁₂ON₂S. MW, 196. Plates
from EtOH. M.p. 110°. Mod. sol. EtOH.
Insol. H₂O.

Bendix, *Ber.*, 1878, **11**, 2263.

Mühlhäuser, *Ann.*, 1881, **207**, 246.

Berlinerblau, *J. prakt. Chem.*, 1884, **30**,
106.

3-Hydroxyphenylthiourea.

Prisms from hot H₂O. M.p. 183–4°.

Et ether: needles. M.p. 112°. Sol. hot
EtOH. Spar. sol. H₂O, C₆H₆.

Meyer, Sundmacher, *Ber.*, 1899, **32**, 2115.

Pierron, *Ann. chim.*, 1908, **15**, 168.

4-Hydroxyphenylthiourea.

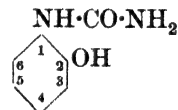
Plates from EtOH. M.p. 220–1° decomp.
(214°). Mod. sol. hot H₂O, hot EtOH. Spar.
sol. cold EtOH. Prac. insol. cold H₂O. Sol.
alkalis and conc. acids.

Et ether: cryst. from EtOH. M.p. 172°. Sol.
H₂O.

Propyl ether: C₁₀H₁₄ON₂S. MW, 210.
Needles from dil. EtOH. M.p. 158°. Sol.
EtOH, Et₂O, C₆H₆. Spar. sol. H₂O.

Kalckhoff, *Ber.*, 1883, **16**, 375, 1832.

2-Hydroxyphenylurea



C₇H₈O₂N₂

MW, 152

Prisms. M.p. 154° decomp. Sol. H₂O,
EtOH, Et₂O. Heat → benzoxazolone. Aq.
sol. resinifies.

Me ether: C₈H₁₀O₂N₂. MW, 166. Cryst.
from EtOH. M.p. 146.5°. Sol. hot H₂O,
EtOH. Spar. sol. cold H₂O.

Kalckhoff, *Ber.*, 1883, **16**, 375.

Mühlhäuser, *Ann.*, 1881, **207**, 244.

3-Hydroxyphenylurea.

Prisms from H₂O. M.p. 180–1°. Sol. hot
EtOH, AcOH. Prac. insol. C₆H₆.

Meyer, Sundmacher, *Ber.*, 1899, **32**, 2114.

4-Hydroxyphenylurea.

Plates from H₂O. M.p. 168° decomp. Sol.
H₂O, EtOH, alkalis and acids.

Et ether: see Dulcin.

Propyl ether: C₁₀H₁₄O₂N₂. MW, 194. Plates
from H₂O. M.p. 147°. Sol. most org. solvents.
Prac. insol. cold H₂O.

O-Acetyl: needles from EtOH. M.p. 201–
202.5°. Sol. hot H₂O, EtOH. Prac. insol. hot
C₆H₆.

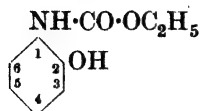
Diacetyl deriv.: needles from AcOEt. M.p.
213.5–214°. Sol. most org. solvents.

O-Benzoyl: yellowish-brown needles. M.p.
148°.

Dibenzoyl deriv.: cryst. M.p. 226–8°.

Kalckhoff, *Ber.*, 1883, **16**, 376.

2-Hydroxyphenylurethane (*o*-Hydroxy-phenylcarbamic ethyl ester, *N*-carbethoxy-*o*-aminophenol)



$\text{C}_9\text{H}_{11}\text{O}_3\text{N}$ MW, 181

Prisms from EtOH-Et₂O. M.p. 86.5°. Sol. EtOH, Et₂O. Prac. insol. cold H₂O. KOH → *o*-aminophenol. Heat → benzoxazolone.

Me ether: $\text{C}_{10}\text{H}_{13}\text{O}_3\text{N}$. MW, 195. B.p. 180-2°/26 mm.

Benzoyl: cryst. from EtOH.Aq. M.p. 76.5°.

Ransom, *Ber.*, 1898, **31**, 1061.

Groenvik, *Bull. soc. chim.*, 1876, **25**, 177.

3-Hydroxyphenylurethane (*m*-Hydroxy-phenylcarbamic ethyl ester, *N*-carbethoxy-*m*-aminophenol).

Cryst. from C₆H₆. M.p. 97°.

Benzoyl: plates from EtOH. M.p. 183-4°.

Bauer, *Ber.*, 1915, **48**, 1580.

4-Hydroxyphenylurethane (*p*-Hydroxy-phenylcarbamic ethyl ester, *N*-carbethoxy-*p*-aminophenol).

Plates from EtOH-Et₂O or hot H₂O. M.p. 123° (120°). Sol. alkalis.

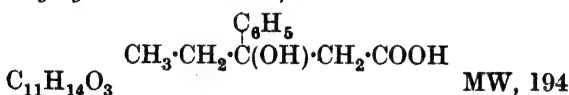
Me ether: needles from EtOH. M.p. 67° (63-4°).

Et ether: $\text{C}_{11}\text{H}_{15}\text{O}_3\text{N}$. MW, 209. Needles or plates from EtOH. M.p. 94°.

Groenvik, *Bull. soc. chim.*, 1876, **25**, 179.

Schönherr, *J. prakt. Chem.*, 1903, **67**, 341.

2-Hydroxy-2-phenyl-*n*-valeric Acid (2-Ethyl-2-phenylhydracrylic acid, β -hydroxy- β -ethylhydrocinnamic acid)



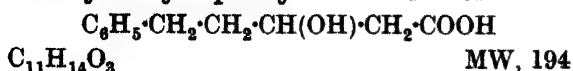
Needles from C₆H₆. M.p. 125° (118°). Sol. H₂O, EtOH, Et₂O. Sol. conc. H₂SO₄ → β -ethylcinnamic acid.

Et ester: $\text{C}_{13}\text{H}_{18}\text{O}_3$. MW, 222. Cryst. from EtOH.Aq. M.p. 34.5°. B.p. 143°/13 mm. Sol. most org. solvents.

Schroeter, Wülfig, *Ber.*, 1907, **40**, 1598.

Stoermer, Grimm, Laage, *Ber.*, 1917, **50**, 970.

2-Hydroxy-4-phenyl-*n*-valeric Acid



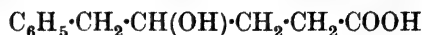
Prisms from H₂O. M.p. 131°. Sol. H₂O, Et₂O. Spar. sol. C₆H₆. Insol. ligroin. Dist. → 4-phenyl-1-butylene-1-carboxylic acid.

Et ester: $\text{C}_{13}\text{H}_{18}\text{O}_3$. MW, 222. B.p. 178-82°/12 mm.

Fittig, Hoffmann, *Ann.*, 1894, **283**, 309, 315.

Farmer, Hose, *J. Chem. Soc.*, 1933, 966.

3-Hydroxy-4-phenyl-*n*-valeric Acid



$\text{C}_{11}\text{H}_{14}\text{O}_3$ MW, 194

Needles from H₂O. M.p. 101-2° decomp. Sci. CHCl₃, CS₂. Spar. sol. H₂O, ligroin.

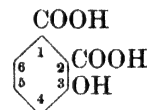
Lactone: 4-phenyl- γ -valerolactone. $\text{C}_{11}\text{H}_{12}\text{O}_2$. MW, 176. Needles from CHCl₃. M.p. 33°. Sol. CHCl₃, CS₂. Spar. sol. H₂O, ligroin.

Fittig, Stern, *Ann.*, 1892, **268**, 91, 96.

Hydroxyphenylvinylacetic Acid.

See Styrylglycollic Acid, *p*-Hydroxystyrylacetic Acid, and 2-Benzoylpropionic Acid.

3-Hydroxyphthalic Acid



$\text{C}_8\text{H}_6\text{O}_5$ MW, 182

Needles or prisms from H₂O. M.p. about 150° → anhydride, 161-3° (rapid heat.). Sol. H₂O, EtOH, Et₂O. Red col. with FeCl₃.

Me ether: 3-methoxyphthalic acid. $\text{C}_9\text{H}_8\text{O}_5$. MW, 196. Prisms from H₂O. M.p. 173-4° → anhydride. Sol. H₂O, EtOH, Et₂O. *Di-Me ester*: $\text{C}_{11}\text{H}_{12}\text{O}_5$. MW, 224. M.p. 71°.

Anhydride: $\text{C}_8\text{H}_6\text{O}_4$. MW, 178. M.p. 160-1°.

Anhydride: $\text{C}_8\text{H}_4\text{O}_4$. MW, 164. Orange yellow cryst. from xylene. M.p. 198-9°. *Acetyl*: m.p. 113.5-115.5°. *Benzoyl*: m.p. 147.5-148°.

Bernthsen, Semper, *Ber.*, 1886, **19**, 167; 1887, **20**, 937.

Miller, *Ann.*, 1881, **208**, 247.

Pratt, Perkins, *J. Am. Chem. Soc.*, 1918, **40**, 227.

Corbellini, Rossi, *Gazz. chim. ital.*, 1931, **61**, 281.

4-Hydroxyphthalic Acid.

Cryst. from H₂O. M.p. 204-5° → anhydride. Sol. EtOH, Et₂O. Spar. sol. C₆H₆, pet. ether. Reddish-yellow col. with FeCl₃. HCl at 180° → *m*-hydroxybenzoic acid.

1-*Me ester*: $C_9H_8O_5$. MW, 196. M.p. 159–60° decomp. Sol. H_2O , EtOH, Et_2O . Insol. C_6H_6 , pet. ether. $k = 1.54 \times 10^{-4}$ at 25°.

2-*Me ester*: needles from H_2O . M.p. 166°. Spar. sol. C_6H_6 . $k = 2.05 \times 10^{-4}$ at 25°.

Di-Me ester: $C_{10}H_{10}O_5$. MW, 210. Plates from H_2O or toluene. M.p. 107–8° (104°). Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O .

1-*Et ester*: $C_{10}H_{10}O_5$. MW, 210. M.p. 175°. $k = 7.3 \times 10^{-4}$ at 25°.

2-*Et ester*: m.p. 152°. $k = 2.2 \times 10^{-4}$ at 25°.

Me ether: 4-methoxyphthalic acid. M.p. 168–70° \rightarrow anhydride. Sol. EtOH, Et_2O . Mod. sol. H_2O . Prac. insol. $CHCl_3$, C_6H_6 . Yellow col. with $FeCl_3$. *Di-Me ester*: b.p. 195–7°/20 mm. *Anhydride*: m.p. 97° (94°, 87°). Sol. EtOH, hot C_6H_6 . Sublimes.

Et ether: $C_{10}H_{10}O_5$. MW, 210. Cryst. + H_2O . Loses H_2O at 100°. M.p. anhyd. 163°. *Di-Me ester*: $C_{12}H_{14}O_5$. MW, 238. Plates from ligroin. M.p. 44–5°. *Anhydride*: $C_9H_8O_5$. MW, 192. M.p. 118°.

Anhydride: $C_8H_4O_4$. MW, 164. M.p. 171–3° (165–6°). Sublimes. Sol. EtOH, Et_2O , Me_2CO . Prac. insol. $CHCl_3$, C_6H_6 , CS_2 .

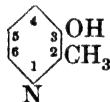
Imide: $C_8H_5O_3N$. MW, 163. M.p. 290°.

Bentley, Weizmann, *J. Chem. Soc.*, 1907, 91, 100.

Rée, *Ann.*, 1886, 233, 232.

Dimroth, Fick, *Ann.*, 1916, 411, 323.

3-Hydroxy- α -picoline (3-Hydroxy-2-methylpyridine)



C_6H_7ON MW, 109

Cryst. M.p. 164–6°.

I.G., D.R.P., 541,681, (*Chem. Abstracts*, 1932, 26, 2471); F.P., 685,583, (*Chem. Abstracts*, 1930, 24, 5766).

4-Hydroxy- α -picoline (4-Hydroxy-2-methylpyridine).

Et ether: $C_8H_{11}ON$. MW, 137. B.p. about 220°. $B_2H_2PtCl_6$: m.p. 207°.

Collie, Bishop, *J. Chem. Soc.*, 1925, 127, 963.

5-Hydroxy- α -picoline (5-Hydroxy-2-methylpyridine).

Cryst. from EtOH– Et_2O . M.p. 165–7°. Sol. H_2O , EtOH. Spar. sol. Et_2O .

Graf, *J. prakt. Chem.*, 1932, 133, 35.

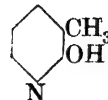
6-Hydroxy- α -picoline (6-Hydroxy-2-methylpyridine).

Cryst. from C_6H_6 . m.p. 157°: needles + 4–5 H_2O from H_2O .

B, HCl : cryst. M.p. anhyd. above 150°.

Errara, *Ber.*, 1900, 33, 2971.

2-Hydroxy- β -picoline (2-Hydroxy-3-methylpyridine)

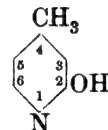


C_6H_7ON MW, 109

Needles from $CHCl_3$ –ligroin. M.p. 140°. B.p. 288–90°/752 mm. Sol. H_2O , EtOH, hot C_6H_6 , $CHCl_3$. Spar. sol. ligroin. $FeCl_3 \rightarrow$ reddish-brown col.

Seide, *Ber.*, 1924, 57, 1805.

2-Hydroxy- γ -picoline (2-Hydroxy-4-methylpyridine)



C_6H_7ON MW, 109

Cryst. from C_6H_6 . M.p. 130°. B.p. 307–9°. Sol. H_2O , EtOH, hot C_6H_6 , $CHCl_3$. Mod. sol. Et_2O . Spar. sol. ligroin. $FeCl_3 \rightarrow$ reddish-brown col.

Seide, *Ber.*, 1924, 57, 793.

3-Hydroxy- γ -picoline (3-Hydroxy-4-methylpyridine).

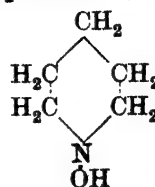
Cryst. M.p. 118–20°. B.p. 285–90°.

I.G., D.R.P., 563,373, (*Chem. Abstracts*, 1933, 27, 1002); F.P., 685,583, (*Chem. Abstracts*, 1930, 24, 5766).

ω -Hydroxypicoline.

See Pyridylcarbinol.

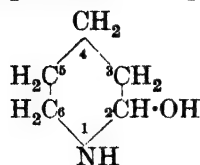
N-Hydroxypiperidine (1-Piperidinol)



$C_5H_{11}ON$ MW, 101

Benzoyl: cryst. from pet. ether. M.p. 62°. Sol. most solvents. Reduces Fehling's.

Gambarajan, *Ber.*, 1925, 58, 1776.

2-Hydroxypiperidine (2-Piperidinol) $C_5H_{11}ON$

MW, 101

Needles from ligroin. M.p. 129°. $FeCl_3 \rightarrow$ violet col.

Wolffenstein, *Ber.*, 1892, 25, 2784.

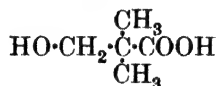
4-Hydroxypiperidine (4-Piperidinol).

N-Me: $C_6H_{13}ON$. MW, 115. Oil. F.p. 28°. B.p. 105°/18 mm. *B,HCl*: prisms from EtOH. M.p. 157-8°. Sol. H_2O , hot EtOH. *B,HBr*: needles from EtOH. M.p. 139-40°.

Mills, Parkin, Ward, *J. Chem. Soc.*, 1927, 2622.

Emmert, D.R.P., 292,846, (*Chem. Abstracts*, 1917, 11, 1884); D.R.P., 292,456, (*Chem. Abstracts*, 1917, 11, 1260).

Hydroxypivalic Acid (*Hydroxytrimethylacetic acid*, 1:1-dimethylhydracrylic acid, 2-hydroxy-1:1-dimethylpropionic acid)

 $C_5H_{10}O_3$

MW, 118

Needles from Et_2O -pet. ether. M.p. 125° (124°). $k = 1.39 \times 10^{-5}$ at 25°. $KMnO_4 \rightarrow$ dimethylmalonic acid. $CrO_3 \rightarrow$ dimethylmalonic acid + isobutyraldehyde.

K salt: cryst. M.p. 234°.

Me ester: $C_6H_{12}O_3$. MW, 132. B.p. 177-8°/740 mm. D_4^{20} 1.0365.

Et ester: $C_7H_{14}O_3$. MW, 146. B.p. 188°/750 mm., 84-6°/16 mm. D_4^{20} 0.9985.

Et ether: $C_7H_{14}O_3$. MW, 146. B.p. 123°/22 mm. Insol. H_2O . *K salt*: cryst. from $MeOH-Me_2CO$. M.p. 255°. *Et ester*: $C_9H_{18}O_3$. MW, 174. B.p. 75°/22 mm.

Acetyl: cryst. from pet. ether. M.p. 56°. *Ca salt*: cryst. M.p. 260° decomp. *Me ester*: b.p. 191-2°/737 mm. D_4^{20} 1.0338. *Et ester*: b.p. 94°/16 mm. D_4^{20} 1.0100. *Chloride*: b.p. 84°/12 mm. *Nitrile*: b.p. 91.5°/11 mm.

Nitrile: C_5H_9ON . MW, 99. Oil. B.p. 97°/11 mm.

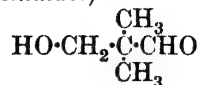
Wessely, *Monatsh.*, 1900, 21, 222; 1901, 22, 66.

Böhm, *Monatsh.*, 1906, 27, 949.

Blaise, *Compt. rend.*, 1902, 134, 552.

Marcilly, *Bull. soc. chim.*, 1904, 31, 122.

Hydroxypivalic Aldehyde (*Hydroxytrimethylacetaldehyde*, 2-hydroxy-1:1-dimethylpropionaldehyde, pentaldol)

 $C_5H_{10}O_2$

MW, 102

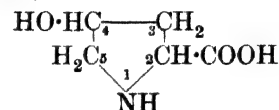
Needles from H_2O . M.p. 89-90°. B.p. 172-3°/747 mm. decomp., 67-9°/14 mm. Sol. H_2O , EtOH. Spar. sol. most other solvents.

Oxime: cryst. M.p. 29.5°. B.p. 129°/18 mm.

Azine: cryst. M.p. 151°. Very sol. EtOH, Et_2O , C_6H_6 . Sol. H_2O . Spar. sol. pet. ether.

Wessely, *Monatsh.*, 1900, 21, 216.

König, *Monatsh.*, 1902, 23, 469.

4-Hydroxyproline (4-Hydroxypyrrolidine-2-carboxylic acid) $C_5H_9O_3N$

MW, 131

Exists in two racemic forms. Isolated from hydrolysis of gelatin. Natural 4-hydroxyproline has $[\alpha]_D^{20} -81.04^\circ$ in H_2O . $HI + P \rightarrow$ proline. *Picrate*: m.p. 188°.

I.

d-.

M.p. 274°. $[\alpha]_D^{21}$ 75.2° in H_2O . Insipid taste. *Phenylisocyanate*: m.p. 175°.

l-.

M.p. 274°. $[\alpha]_D^{26}$ -74.6°. Sweet taste.

dl-.

M.p. 261°. Sol. H_2O . Spar. sol. EtOH. Sweet taste.

II.

d-.

M.p. 237-41°. $[\alpha]_D^{18}$ 58.6°. Insipid taste.

l-.

M.p. 238-41°. $[\alpha]_D^{18}$ -58.1°. Sweet taste.

dl-.

M.p. 250°. Less sol. H_2O than dl-I. Insipid taste.

Fischer, *Ber.*, 1902, 35, 2660.

Klabunde, *J. Biol. Chem.*, 1931, 90, 293.

Traube, Johow, Tepohl, *Ber.*, 1923, 56, 1861.

Kapfhammer, Eck, *Z. physiol. Chem.*, 1927, 170, 294.

Leuchs, Bormann, *Ber.*, 1919, 52, 2086.

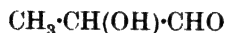
Leuchs, *Ber.*, 1905, 38, 1937.

5-Hydroxyproline (5-Hydroxyproline-2-carboxylic acid).

M.p. 204-5°.

Abderhalden, Schwab, *Z. physiol. Chem.*, 1926, 153, 88.**Hydroxypropane-tricarboxylic Acid.**

See Citric Acid and Isocitric Acid.

Hydroxypropenylfuran.See 3- α -Furylallyl Alcohol.**1-Hydroxypropionaldehyde** (Lactic aldehyde) $\text{C}_3\text{H}_6\text{O}_2$

MW, 74

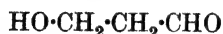
Needles from EtOH. M.p. 105° (sinters at 101°). Bimolecular. Dissociates into monomolecular form in aq. sol. Sol. AcOH. Mod. sol. H_2O , EtOH, Me_2CO . Insol. Et_2O , CHCl_3 , C_6H_6 . Reduces cold Fehling's. Yellowish-brown col. on warming with alkali. $\text{C}_6\text{H}_5\text{NH}\cdot\text{NH}_2 \rightarrow$ lactic aldehyde phenylhydrazone + methylglyoxalosazone.

Acetyl deriv.: see 1-Acetoxypionaldehyde.

Di-Et acetal: $\text{C}_7\text{H}_{16}\text{O}_3$. MW, 148. B.p. 169-70°/758 mm., 67°/12-13 mm.

Phenylhydrazone: plates from C_6H_6 -pet. ether. M.p. 93°.

Phenylosazone: yellow needles from dil. EtOH. M.p. 154° (148°).

Wohl, *Ber.*, 1908, 41, 3602.Wohl, Lange, *ibid.*, 3608.**2-Hydroxypropionaldehyde** (Hydracrylic aldehyde) $\text{C}_3\text{H}_6\text{O}_2$

MW, 74

B.p. 90°/18 mm., 75-8°/12 mm. Sol. EtOH, Et_2O , Me_2CO . Spar. sol. H_2O . Reduces $\text{NH}_3\cdot\text{AgNO}_3$. Does not reduce Fehling's. $\text{KHSO}_4 \rightarrow$ acrolein. $\text{NO}_2 + \text{HCl} + \text{albumin} \rightarrow$ green col. in concentrations up to 1:1000, rose col. in more dil. sol.

Di-Et acetal: $\text{C}_7\text{H}_{16}\text{O}_3$. MW, 148. B.p. 98°/20 mm. $\text{KMnO}_4 \rightarrow$ 2:2-diethoxypropionic acid. $\text{O}_3 \rightarrow$ hydracrylic aldehyde + glyoxal.

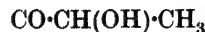
Semicarbazone: cryst. from H_2O . M.p. 114°.

Wohl, *Ber.*, 1908, 41, 3603.Nef, *Ann.*, 1904, 335, 219.Harries, *Ann.*, 1910, 374, 320.**Hydroxypropionic Acid.**

See Lactic Acid and Hydracrylic Acid.

1-Hydroxy-2-propionaphthone.

See Ethyl 1-hydroxy-2-naphthyl Ketone.

 β -Hydroxypropionophenone (1-Hydroxyethyl phenyl ketone, methylbenzoylcarbinol, 1-benzoyl-ethyl alcohol) $\text{C}_9\text{H}_{10}\text{O}_2$

MW, 150

Yellow oil. B.p. 250-2°, 125-6°/14 mm. D_4^{18} 1.1085. n_D^{25} 1.536.

Et ether: $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. p-Nitrophenylhydrazone: m.p. 40°.

Acetyl: yellow aromatic oil. B.p. 158-60°/20 mm. D_4^{20} 1.112. n_D^{20} 1.515. Sol. EtOH, Et_2O . Insol. H_2O .

Semicarbazone: needles from EtOH. M.p. 188-9° (194°).

Phenylhydrazone: yellow needles from MeOH. M.p. 179-80°.

Auwers, *Ber.*, 1917, 50, 1179.Collet, *Compt. rend.*, 1897, 125, 354.Zincke, Zahn, *Ber.*, 1910, 43, 855.Kotcherigine, *Bull. soc. chim.*, 1928, 43, 573. **γ -Hydroxypropionophenone** (2-Hydroxyethyl phenyl ketone, 2-benzoyl-ethyl alcohol, phenacylcarbinol) $\text{C}_9\text{H}_{10}\text{O}_2$

MW, 150

Me ether: $\text{C}_{10}\text{H}_{12}\text{O}_2$. MW, 164. B.p. 125-6°/16 mm. D_4^{18} 1.020.

Et ether: m.p. 11-12°. B.p. 135°/18 mm.

Acetyl: m.p. 53-4°.

Kohler, *Am. Chem. J.*, 1909, 42, 388.Straus, Berkow, *Ann.*, 1913, 401, 144.**2-Hydroxypropionophenone** (Ethyl o-hydroxyphenyl ketone, o-propionylphenol) $\text{C}_9\text{H}_{10}\text{O}_2$

MW, 150

B.p. 150°/80 mm., 115°/15 mm. Sol. EtOH, Et_2O . Spar. sol. H_2O . Sol. alkalis. $\text{FeCl}_3 \rightarrow$ intense violet col. $\text{NaHg} \rightarrow$ ethyl-o-hydroxyphenylcarbinol.

Me ether: o-propionylanisole. $\text{C}_{10}\text{H}_{12}\text{O}_2$. MW, 164. Pale yellow liq. B.p. 137°/16.5 mm. Semicarbazone: m.p. 154°.

Benzoyl: b.p. 158°/1 mm. *Isonitroso deriv.*: m.p. 89°.

Oxime: m.p. 93-4°.

Semicarbazone: m.p. 213° (221°).

2:4-Dinitrophenylhydrazones: scarlet cryst. M.p. 189°.

Fischer, Slimmer, *Ber.*, 1903, **36**, 2585.

Robertson, Sandrock, Hendry, *J. Chem. Soc.*, 1931, 2426.

Petschek, Simonis, *Ber.*, 1913, **46**, 2017.

Böckmühl, Ehrhart, Stein, D.R.P., 552,244, (*Chem. Abstracts*, 1932, **26**, 4343).

4-Hydroxypropiophenone (*Ethyl p-hydroxyphenyl ketone*, *p-propionylphenol*).

Needles or prisms from H_2O . M.p. 148°. Sol. $EtOH$, Et_2O . Spar. sol. H_2O . $Alk. H_2O_2 \rightarrow$ hydroquinone. KOH fusion \rightarrow *p*-hydroxybenzoic acid + phenol.

Me ether: *p*-propionylanisole. Needles from Et_2O . M.p. 27-9°. B.p. 273-5°, 145-7°/14 mm. D_4^{20} 1.082. n_D^{20} 1.5477 (both these values are for supercooled state). *Oxime*: needles from $EtOH$. M.p. 67° (74°). *Semicarbazone*: m.p. 172-3° (177°). *p-Nitrophenylhydrazones*: orange-red cryst. M.p. 149-50°.

Et ether: *p*-propionylphenetole. $C_{11}H_{14}O_2$. MW, 178. Prisms from Et_2O . M.p. 30°. B.p. 153-4°/14 mm. *Oxime*: needles from $EtOH$. Aq. M.p. 97°.

Isobutyl ether: $C_{13}H_{18}O_2$. MW, 206. Needles from $EtOH$. M.p. 52°. B.p. 172-4°/14 mm. *Oxime*: cryst. from $EtOH$. M.p. 49°.

Acetyl: cryst. from ligroin. M.p. 62°.

2:4-Dinitrophenylhydrazones: ruby-red cryst. M.p. 229°.

Wallach, Pond, *Ber.*, 1895, **28**, 2715.

Gattermann, Ehrhardt, Mais, *Ber.*, 1890, **23**, 1203.

Unger, *Ann.*, 1933, **504**, 280.

Klages, *Ber.*, 1902, **35**, 2262.

Goldzweig, Kaiser, *J. prakt. Chem.*, 1891, **43**, 86.

Auwers, *Ann.*, 1915, **408**, 248.

Noller, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 1892.

Crépieux, *Bull. soc. chim.*, 1891, **6**, 160.

Hydroxypropylamine.

See Aminopropyl Alcohol and Aminoisopropyl Alcohol.

α -Hydroxypropylbenzene.

See Ethylphenylcarbinol.

β -Hydroxypropylbenzene.

See Methylbenzylcarbinol.

γ -Hydroxypropylbenzene.

See Hydrocinnamyl Alcohol.

2-Hydroxypropylene.

See Isopropenyl Alcohol.

3-Hydroxypropylene.

Allyl Alcohol, *q.v.*

3-Hydroxypropylene oxide.

See Glycide.

4-Hydroxy-4-propylheptene-1.

See Dipropylallylcarbinol.

β -1-Hydroxypropylhydrocinnamic Acid.

See 3-Hydroxy-2-phenyl-*n*-caproic Acid.

β -2-Hydroxypropylhydrocinnamic Acid.

See 4-Hydroxy-2-phenyl-*n*-caproic Acid.

β -Hydroxy- β -propylhydrocinnamic Acid.

See 2-Hydroxy-2-phenyl-*n*-caproic Acid.

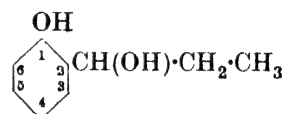
2-Hydroxypropylidene chloride.

See *unsym.*-Dichloroisopropyl Alcohol.

3- ω -Hydroxypropylindole.

See 3-[3-Indolyl]-propyl Alcohol.

2- α -Hydroxypropylphenol (1-*o*-Hydroxyphenylpropyl alcohol, ethyl-*o*-hydroxyphenylcarbinol, α -2-dihydroxypropylbenzene)



$C_9H_{12}O_2$

MW, 152

Oil. B.p. 125-30°/0.25 mm. Spar. sol. H_2O . Reduces hot Fehling's.

2-*Me ether*: 2- α -hydroxypropylanisole. $C_{10}H_{14}O_2$. MW, 166. Oil. B.p. 251°/760 mm. 138°/22 mm. *Phenylarethane*: m.p. 102°.

2-*Et ether*: 2- α -hydroxypropylphenetole. $C_{11}H_{16}O_2$. MW, 180. Oil. B.p. 129-30°. D_4^{22} 1.0113. n_D^{20} 1.5232. *Phenylurethane*: needles. M.p. 95-6°.

Hell, Hofmann, *Ber.*, 1905, **38**, 1678.

Klages, *Ber.*, 1904, **37**, 3988.

Fischer, Stimmer, *Ber.*, 1903, **36**, 2586.

3- α -Hydroxypropylphenol (1-*m*-Hydroxyphenylpropyl alcohol, ethyl-*m*-hydroxyphenylcarbinol, α -3-dihydroxypropylbenzene).

Prisms from H_2O . Needles from C_6H_6 . M.p. 107°. B.p. 177°/13 mm. Sol. $EtOH$, Et_2O , H_2O . Spar. sol. C_6H_6 . $FeCl_3 \rightarrow$ bluish-violet col.

Auwers, *Ann.*, 1917, **413**, 306.

4- α -Hydroxypropylphenol (1-*p*-Hydroxyphenylpropyl alcohol, ethyl-*p*-hydroxyphenylcarbinol, α -4-dihydroxypropylbenzene).

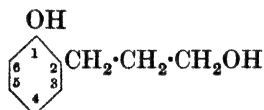
Oil. B.p. 143°/20 mm., 141-2°/16 mm. Dil. $H_2SO_4 \rightarrow$ anethole.

4-*Me ether*: 4-α-hydroxypropylanisole. $C_{10}H_{14}O_2$. MW, 166. B.p. 252-6°. *Acetyl*: b.p. 156°/20 mm. D_{16}^{20} 1.005. *Phenylurethane*: m.p. 74°.

4-*Et ether*: 4-α-hydroxypropylphenetole. $C_{11}H_{16}O_2$. MW, 180. Oil. B.p. 144.5-145.5°/10 mm. D_{16}^{20} 1.1022. Spar. sol. H_2O . *Acetyl*: b.p. 161°/17 mm.

Hell, Hofmann, *Ber.*, 1905, **38**, 1678.
Klages, *ibid.*, 2221.

2-γ-Hydroxypropylphenol (3-o-Hydroxyphenylpropyl alcohol)



$C_9H_{12}O_2$ MW, 152

Yellow oil. B.p. 177-9°/12 mm. D_{15}^{21} 1.1258. Spar. sol. H_2O . $FeCl_3 \rightarrow$ bluish-violet col.

Auwers, *Ann.*, 1918, **415**, 152.

4-γ-Hydroxypropylphenol (3-p-Hydroxyphenylpropyl alcohol).

Cryst. from Et_2O -pet. ether. M.p. 55°. Sol. H_2O . $FeCl_3 \rightarrow$ indigo blue col. Reduces $NH_3 \cdot AgNO_3$.

Dibenzoyl: m.p. 72°.

v. Braun, *Deutsch, Ber.*, 1912, **45**, 2513.

Hydroxypropyl phenyl Ketone.

See β-Hydroxybutyrophenone and γ-Hydroxybutyrophenone.

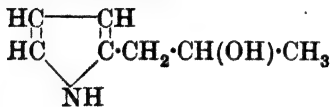
2-α-Hydroxypropylpiperidine.

See Conhydrine.

4-Hydroxy-2-propylpiperidine.

See ψ-Conhydrine.

2-β-Hydroxypropylpyrrole (Pyrryl-2-propanol, 1-pyrrylisopropyl alcohol)



$C_7H_{11}ON$ MW, 125

Oil. B.p. 134-9°/14-15 mm. $HI + AcOH \rightarrow$ 2-propylpyrrole.

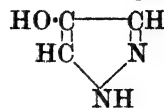
N-Me: $C_8H_{13}ON$. MW, 139. Oil. B.p. 116-17°/18 mm. Sol. H_2O and usual org. solvents.

Hess, *Ber.*, 1913, **46**, 3117.

6-Hydroxypurine.

See Hypoxanthine.

4-Hydroxypyrazole (4-Pyrazolol)



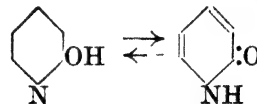
$C_3H_4ON_2$ MW, 84

White plates from $EtOH-CHCl_3$. M.p. 118-18.5°. Very sol. H_2O , $EtOH$. Sol. Et_2O , hot $AcOEt$. Spar. sol. $CHCl_3$, C_6H_6 . Reduces $NH_3 \cdot AgNO_3$. $FeCl_3 \rightarrow$ greenish-blue col.

Dibenzoyl: needles from $EtOH$. M.p. 109°. Very sol. $CHCl_3$, C_6H_6 . Spar. sol. Et_2O , $EtOH$. *Picrate*: yellow needles. M.p. 128-9°.

Wolff, Lüttringhaus, *Ann.*, 1900, **313**, 8.

2-Hydroxypyridine (α-Hydroxypyridine, α-pyridone)



C_5H_5ON MW, 95

Needles from C_6H_6 . M.p. 106-7°. B.p. 280-1°. Sol. H_2O , $EtOH$, $CHCl_3$. Mod. sol. Et_2O , C_6H_6 . Spar. sol. ligroin. Aq. sol. reacts neutral. $C_2H_5I + NaOH \rightarrow$ *N*-ethyl-α-pyridone. Ag salt + $C_2H_5I \rightarrow$ 2-ethoxypyridine.

O-Benzyl: m.p. 42°. B.p. 183-6°/30 mm. Sol. most org. solvents.

Me ether: $HgCl_2$ comp., m.p. 199-200°.

Et ether: C_7H_9ON . MW, 123. B.p. 155-6°. $HgCl_2$ comp., m.p. 141-2°.

N-Me deriv.: C_6H_7ON . MW, 109. B.p. 250°. $HgCl_2$ comp., m.p. 127°. Misc. with H_2O .

N-Et deriv.: C_7H_9ON . MW, 123. B.p. 249-50°. $HgCl_2$ comp., m.p. 112-13°. Misc. with H_2O .

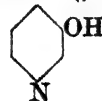
Königs, Feer, *Ber.*, 1886, **19**, 2433.

v. Pechmann, Baltzer, *Ber.*, 1891, **24**, 3145.

Weidel, Strache, *Monatsh.*, 1886, **7**, 297.

Räth A.-G., E.P., 288,628, (*Chem. Abstracts*, 1929, **23**, 607).

3-Hydroxypyridine (β-Hydroxypyridine)



C_5H_5ON MW, 95

Needles. M.p. 129°. Sol. H_2O , $EtOH$. Red col. with $FeCl_3$. $Zn \rightarrow$ pyridine. Br water \rightarrow dibromo-3-hydroxypyridine.

Et ether: $B_2H_3PtCl_6$, prisms. M.p. 192°.

Acetyl: b.p. 210°. Sol. H_2O .

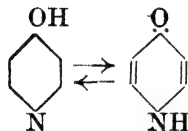
Oxalate: m.p. 177°.

Weidel, Murmann, *Monatsh.*, 1895, 16, 753.

Fischer, Renouf, *Ber.*, 1884, 17, 763.

Fischer, Yoshioka, Hartmann, *Z. physiol. Chem.*, 1932, 212, 146.

4-Hydroxypyridine (γ -Hydroxypyridine, γ -pyridone)



C_5H_5ON

MW, 95

Needles or prisms + H_2O from H_2O . M.p. anhyd. 148.5°. B.p. above 350°. Loses H_2O of cryst. over H_2SO_4 in vacuo. Sol. 1 part H_2O at 15°. Sol. EtOH. Prac. insol. Et_2O , C_6H_6 . $Zn \rightarrow$ pyridine. $PCl_3 \rightarrow$ 4-chloropyridine.

Me ether: C_6H_7ON . MW, 109. B.p. 190.5–191°/738 mm. Misc. with H_2O . Gives alkaline reaction.

N-Me deriv.: deliquescent cryst. mass.

O-Acetyl: m.p. 140–50°.

O-Benzoyl: m.p. 81°.

Lerch, *Monatsh.*, 1884, 5, 402.

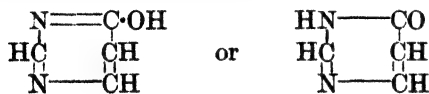
Koenigs, Greiner, *Ber.*, 1931, 64, 1055;

D.R.P., 554,702, (*Chem. Abstracts*, 1932, 26, 5966); D.R.P., 566,693, (*Chem. Abstracts*, 1933, 27, 2457).

4-Hydroxypyridine-2:6-dicarboxylic Acid.

See Chelidamic Acid.

6-Hydroxypyrimidine



$C_4H_4ON_2$

MW, 96

Needles from AcOEt or C_6H_6 . M.p. 164–5°. Very sol. H_2O , EtOH. Sol. AcOEt, C_6H_6 . Spar. sol. Et_2O . Insol. pet. ether.

$B_2HCl \cdot 1H_2O$: m.p. 100°, anhyd. 205–10°. Readily sol. H_2O .

$B_2H_2SO_4$: m.p. 218° decomp. Readily sol. H_2O .

Acetyl deriv.: needles. M.p. 180° subsequently solidifying and remelting at 215–20° decomp.

Picrate: cryst. M.p. 190°.

Wheeler, *J. Biol. Chem.*, 1907, 3, 285.

Cherbuliez, Stavritsch, *Helv. Chim. Acta*, 1922, 5, 281.

3-Hydroxy- α -pyrone.

See Hydroxycoumalin.

6-Hydroxy- α -pyrone.

See under Glutaconic Acid.

2-Hydroxy- γ -pyrone.

See Pyromeconic Acid.

5-Hydroxy- γ -pyrone-2-carboxylic Acid.

See Comenic Acid.

3-Hydroxy- γ -pyrone-2:6-dicarboxylic Acid.

See Meconic Acid.

Hydroxypyrotartaric Acid.

See Itamalic Acid.

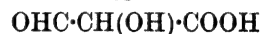
Hydroxypyruvic Aldehyde.

See Glycerosone.

Hydroxypyruvic Acid (*Hydroxyaldehydoacetic acid, hydroxyformylacetic acid, formylglycollic acid*)



or



$C_3H_4O_4$

MW, 104

Cryst. from Et_2O -pet. ether. Hygroscopic. Reduces Fehling's and $NH_3 \cdot AgNO_3$. Alk. sols. give violet col. with $FeCl_3$.

Osazone: m.p. 213–15°.

p-Nitrophenylhydrazones: red cryst. M.p. 260°. Insol. most org. solvents.

Semicarbazone-semicarbazide: cryst. from AcOH. M.p. 221°.

Berl, Smith, *Chem. Zentr.*, 1908, II, 686.

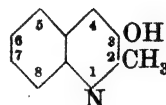
Berl, Fodor, *Chem. Zentr.*, 1910, II, 1039.

Fenton, Wilks, *J. Chem. Soc.*, 1912, 101, 1579.

α -Hydroxyquinaldine.

See 2-Hydroxymethylquinoline.

3-Hydroxyquinaldine (*3-Hydroxy-2-methylquinoline, 2-methyl-3-quinolol*)



$C_{10}H_9ON$

MW, 159

Two compounds have been described.

(i) Needles from EtOH. M.p. 203–5°. Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. H_2O . $Zn \rightarrow$ quinaldine.

$B_2, H_2SO_4, 2H_2O$: needles. M.p. 86–7°. Spar. sol. H_2O .

$B_2, H_2PtCl_6, 2H_2O$: orange-red needles from EtOH. M.p. anhyd. 225–8° decomp.

Picrate: needles from EtOH. M.p. 95–6°.

Kulisch, *Monatsh.*, 1895, **16**, 355.

(ii) Turns yellow at 240°, sinters at 250°, m.p. 260°. Sol. EtOH, Me_2CO , AcOEt. Spar. sol. hot H_2O , Et_2O , C_6H_6 . Non-volatile in steam. Red col. with $FeCl_3$ in dil. EtOH.

B, HCl : needles from dil. HCl. M.p. 265°.

$B_2, H_2SO_4, 2H_2O$: loses H_2O at 140°. M.p. 192–3°.

$B_2, H_2PtCl_6, 2H_2O$: m.p. 210° decomp.

Picrate: needles from EtOH. M.p. 245–6° decomp.

Et ether: $C_{12}H_{13}ON$. MW, 187. Needles from dil. EtOH. M.p. anhyd. 69–70°. Blue fluor. in alkaline sol. *Methiodide*, $1\frac{1}{2}H_2O$: m.p. 207°.

Methiodide: m.p. 235–40°.

Königs, Stockhausen, *Ber.*, 1902, **35**, 2556.

4-Hydroxyquinaldine (2-Methyl-4-quinolol).

Prisms from H_2O . Loses H_2O at 110°, m.p. anhyd. 232°. Sol. EtOH. 1 part sol. in 100 parts cold and 10 parts boiling H_2O . Prac. insol. Et_2O , C_6H_6 , ligroin. Non-volatile in steam. Bluish-red col. with $FeCl_3$ in H_2O . $Zn \rightarrow$ quinaldine. $PCl_3 \rightarrow$ 4-chloroquinaldine. $P_2S_5 \rightarrow$ 4-mercaptoquinaldine.

Me ether: $C_{11}H_{11}ON$. MW, 173. Needles from H_2O . M.p. 82°. B.p. 294–8°.

B_2, H_2PtCl_6 : yellow needles. M.p. 215° decomp. Spar. sol. cold H_2O .

Picrate: yellow needles from H_2O . M.p. 200°.

Methiodide, $1H_2O$: loses H_2O at 100°. M.p. anhyd. 201°.

Limpach, *Ber.*, 1931, **64**, 969.

Conrad, Limpach, *Ber.*, 1887, **20**, 948; D.R.P., 42,276.

Knorr, *Ber.*, 1887, **20**, 1398.

Backeberg, *J. Chem. Soc.*, 1931, 2816.

5-Hydroxyquinaldine (2-Methyl-5-quinolol).

Plates from EtOH. M.p. 246–7° (232–4°). Sol. Et_2O . Spar. sol. EtOH. Prac. insol. H_2O .

$B, HCl, 2H_2O$: yellow needles. Spar. sol. cold H_2O .

Me ether: *picrate*, m.p. 217° decomp.

Et ether: b.p. 307–8°/770 mm., 290–2°/760 mm., 174–5°/11 mm. *Ethiodide*: yellow prisms.

M.p. 216–18° (166°). *Picrate*: yellow needles. M.p. 213° (206–7°).

Decker, Remfry, *Ber.*, 1905, **38**, 2775.

Döbner, Miller, *Ber.*, 1884, **17**, 1709.

Chemische Fabrik auf Actien, D.R.P., 29,819.

6-Hydroxyquinaldine (2-Methyl-6-quinolol).

M.p. 213°. Sol. EtOH, Et_2O . Spar. sol. H_2O . Non-volatile in steam.

Et ether: plates. M.p. 71°. *Ethiodide*: yellow needles. M.p. 182°. *Picrate*: yellow needles. M.p. 192°.

Döbner, Miller, *Ber.*, 1884, **17**, 1708.

Chemische Fabrik auf Actien, D.R.P.s., 24,317, 29,819.

8-Hydroxyquinaldine (2-Methyl-8-quinolol).

Prisms from dil. EtOH. M.p. 74°. B.p. 266–7°. Sol. hot EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O . Sublimes at 100°. Volatile in steam.

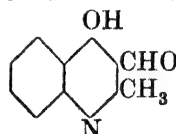
Me ether: cryst. from C_6H_6 . M.p. 125°. B.p. 282°. Sol. EtOH, Et_2O , hot C_6H_6 . Spar. sol. H_2O .

Döbner, Miller, *Ber.*, 1884, **17**, 1706.

Wallach, Wüsten, *Ber.*, 1883, **16**, 2010.

See also last reference above.

4-Hydroxyquinaldine-3-aldehyde (4-Hydroxy-3-aldehydroquinaldine)



$C_{11}H_9O_2N$

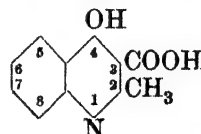
MW, 187

Yellow plates from MeOH. M.p. 273° decomp. Spar. sol. H_2O , Et_2O , C_6H_6 . Sol. dil. alkalis and conc. acids.

B_2, H_2PtCl_6 : orange cryst. M.p. 215–20° decomp.

Conrad, Limpach, *Ber.*, 1888, **21**, 1972.

4-Hydroxyquinaldine-3-carboxylic Acid



$C_{11}H_9O_3N$

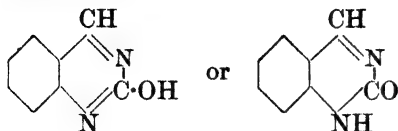
MW, 203

Cryst. from EtOH. M.p. 247–8°. Prac. insol. H_2O , Et_2O , C_6H_6 . Heat \rightarrow 4-hydroxyquinaldine.

Conrad, Limpach, *Ber.*, 1888, **21**, 1975.

Niementowski, *Ber.*, 1894, **27**, 1400.

Camps, *Ber.*, 1901, **34**, 2717.

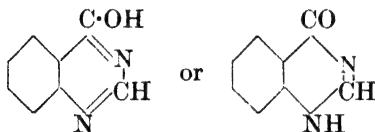
2-Hydroxyquinazoline (α -Hydroxyquinazoline, α -quinazolone)

$C_8H_6ON_2$ MW, 146

White micro-cryst. powder. Insol. H_2O , EtOH.

B, HCl : yellow prisms. M.p. above 300° .

Gabriel, Stelzer, *Ber.*, 1896, **29**, 1313.

4-Hydroxyquinazoline (γ -Hydroxyquinazoline, γ -quinazolone)

$C_8H_6ON_2$ MW, 146

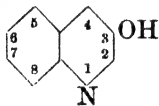
Needles from H_2O . M.p. $211-12^\circ$. Very sol. H_2O , EtOH. Spar. sol. Et_2O . Insol. ligroin.

Niementowski, *J. prakt. Chem.*, 1895, **51**, 565.

Knappe, *J. prakt. Chem.*, 1891, **43**, 214.

2-Hydroxyquinoline.

See Carbostyryl.

3-Hydroxyquinoline (β -Hydroxyquinoline)

C_9H_7ON MW, 145

Cryst. from C_6H_6 . M.p. 198° . Mod. sol. hot H_2O , EtOH. Spar. sol. Et_2O , $CHCl_3$. Prac. insol. cold H_2O . Sol. acids and alkalis. Faint fluor. in acid sol. Brownish-red col. with $FeCl_3$.

$B_2, H_2SO_4, 2H_2O$: m.p. $190-2^\circ$ decomp. Spar. sol. H_2O .

Picrate: m.p. $240-5^\circ$.

Bargellini, Settini, *Gazz. chim. ital.*, 1923, **53**, 601.

Mills, Watson, *J. Chem. Soc.*, 1910, **97**, 743.

4-Hydroxyquinoline (γ -Hydroxyquinoline, *Kynurine*. Keto form, see γ -Quinolone).

Needles + $3H_2O$. Loses H_2O at 110° . M.p. anhyd. 201° . Sublimes with difficulty.

Sol. EtOH. Spar. sol. Et_2O , C_6H_6 , ligroin. 100 parts H_2O dissolve 0.477 parts at 15° . Shows alkaline reaction. Red col. with $FeCl_3$. $Zn \rightarrow$ quinoline. $KMnO_4 \rightarrow$ kynuric acid. $PCl_5 \rightarrow$ 4-chloroquinoline. $C_2H_5I + KOH \rightarrow$ two Et ethers, b.p. $295-300^\circ$ and b.p. above 360° .

$B_2, HCl, 2H_2O$: loses H_2O at 110° . M.p. anhyd. 187° .

Skraup, *Monatsh.*, 1888, **9**, 821; 1889, **10**, 726.

Wenzel, *Monatsh.*, 1894, **15**, 465.

Camps, *Ber.*, 1901, **34**, 2709.

5-Hydroxyquinoline.

Plates. M.p. 224° . Spar. sol. EtOH. Prac. insol. ligroin. Non-volatile in steam. Brownish-red col. with $FeCl_3$ in dil. EtOH. $Br \rightarrow$ 6:8-dibromo deriv.

B, HCl : m.p. 240° .

$B_2, H_2PtCl_6, 4H_2O$: m.p. 230° decomp.

Methiodide: m.p. 224° .

Riemerschmied, *Ber.*, 1883, **16**, 721.

Tellmann, *Ber.*, 1887, **20**, 2174.

Claus, Howitz, *J. prakt. Chem.*, 1893, **47**, 432.

6-Hydroxyquinoline.

Prisms from EtOH or Et_2O . M.p. 193° . B.p. above 360° . Spar. sol. EtOH. Prac. insol. cold H_2O , $CHCl_3$, C_6H_6 . Sol. acids and alkalis. Yellow col. with $FeCl_3$ in dil. EtOH. $Br \rightarrow$ 5-bromo deriv.

B, HCl, H_2O : sol. H_2O . Spar. sol. hot EtOH.

Me ether: *p*-quinanisole. $C_{10}H_9ON$. MW, 159. M.p. 26.5° . B.p. 284° , $153^\circ/12$ mm. D_4^{20} 1.665, D_4^{25} 1.1542. Blue fluor. in acid sol. No col. with $FeCl_3$ in acid sol. *Methiodide*: m.p. 236° decomp.

Et ether: $C_{11}H_{11}ON$. MW, 173. B.p. $290-2^\circ$.

O-Acetyl: m.p. $36-8^\circ$. B.p. 298° . Sol. hot H_2O , EtOH, Et_2O .

O-Benzoyl: needles from AcOH. M.p. $230-1^\circ$. Prac. insol. H_2O , EtOH, Et_2O .

$C_9H_7ON, C_6H_5(NO_2)_3$: 1:3:5: m.p. $193-5^\circ$.

Picrate: golden needles. M.p. $235-6^\circ$.

Skraup, *Monatsh.*, 1882, **3**, 545; 1883, **4**, 696; 1885, **6**, 762; D.R.P., 14,976.

Iwamiya, *Journal of the Pharmaceutical Society, Japan*, 1929, **49**, 792.

7-Hydroxyquinoline.

Prisms from EtOH. Turns brown at 200° .

M.p. 235° decomp. (238–40°). Sol. EtOH. Spar. sol. H₂O. More sol. CHCl₃ than the 6-isomer. Sol. alkalis with green fluor. Sublimes on rapid heating. Brownish-red col. with FeCl₃ in dil. EtOH.

B.HCl, 1/2 H₂O: prisms. Sol. H₂O.

Me ether: b.p. 275°/720 mm. part. decomp. Volatile in steam.

Methiodide: needles from dil. EtOH. M.p. 251° decomp.

O-Benzoyl: prisms. M.p. 88–9°. Sol. EtOH.

C₉H₇ON, C₆H₃(NO₂)₃-1:3:5: m.p. 199–200° decomp.

Picrate: prisms from EtOH. M.p. 244–5° decomp. Spar. sol. cold EtOH.

Fischer, *Ber.*, 1882, 15, 1979.

Skraup, *Monatsh.*, 1882, 3, 559.

Claus, Massau, *J. prakt. Chem.*, 1893, 48, 176.

I.G., F.P., 727,528, (*Chem. Abstracts*, 1932, 26, 5104).

8-Hydroxyquinoline (Quinophenol, oxine).

Needles from dil. EtOH. M.p. 75–6°. B.p. 266.6°/752 mm. Sol. EtOH, Me₂CO, CHCl₃, C₆H₆. Prac. insol. cold H₂O, Et₂O. Sol. acids and alkalis. Green col. with FeCl₃ in aq. sol. Sublimes. Mod. volatile in steam. KMnO₄ → quinolinic acid. KOH fusion → 2:8-dihydroxyquinoline.

Reduces warm NH₃.AgNO₃. Br → 5-bromo and 5:7-dibromo derivs. Used for estimation of Mg, Zn, Al, Cu, Cd, Bi, Fe, Mn, Ni, Co, Ti, and V, and for separation of Be from Al.

B.HCl, H₂O: yellow needles. Sol. H₂O, EtOH.

B₂H₂SO₄: quinosol, chinosol. Yellow cryst. Sol. H₂O. Antiseptic and disinfectant.

Me ether: o-quinanisole. M.p. 49–50° (46.5°). B.p. 282°/742 mm., 164°/14 mm. Spar. volatile in steam. *Picrate*: m.p. 143° decomp. *Methiodide*: m.p. 160° decomp.

Et ether: C₁₁H₁₁ON. MW, 173. Needles. B.p. 285–7°/718 mm. Spar. volatile in steam. *Methiodide*: yellow prisms from H₂O. M.p. 200°.

O-Acetyl: b.p. 280°. Sol. dil. HCl. Spar. sol. AcOH. Readily hyd. on standing.

O-Benzoyl: cryst. from EtOH. M.p. 118–20°. Sol. EtOH, Et₂O. Insol. H₂O.

O-p-Nitrobenzoyl: m.p. 174–5°.

C₉H₇ON, C₆H₃(NO₂)₃-1:3:5: m.p. 123.5–124°.

Picrate: yellow prisms. M.p. 203–4°. Prac. insol. cold EtOH, C₆H₆.

Methiodide, H₂O: yellow needles. M.p. 143° decomp. Spar. sol. EtOH. Insol. Et₂O.

Skraup, *Monatsh.*, 1882, 3, 536; D.R.P., 14,976.

Weidel, Cobenzl, *Monatsh.*, 1880, 1, 862.

Bedall, Fischer, *Ber.*, 1881, 14, 1366.

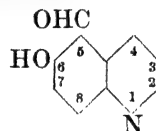
Isiwara, Jap. P., 94,165, (*Chem. Abstracts*, 1933, 27, 2697).

Winthrop, U.S.P., 1,903,470, (*ibid.*, 3223).

Riedel-E de Haën, E.P., 383,920, (*ibid.*, 4246).

I.G., E.P., 301,545, (*Chem. Abstracts*, 1929, 23, 3931).

6-Hydroxyquinoline-5-aldehyde (6-Hydroxy-5-aldehydroquinoline)



C₁₀H₇O₂N MW, 173

Cryst. from MeOH. M.p. 138.5°. Sol. EtOH, Et₂O, CHCl₃, Me₂CO, C₆H₆. Mod. sol. MeOH. Spar. sol. H₂O. Sublimes.

Oxime: m.p. 235°.

Phenylhydrazone: yellow needles. M.p. 232–4° decomp.

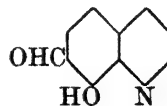
Bobrański, *J. prakt. Chem.*, 1932, 134, 146.

8-Hydroxyquinoline-5-aldehyde (8-Hydroxy-5-aldehydroquinoline).

Brown cryst. powder from quinoline. M.p. above 250°. Sol. AcOH. Insol. H₂O, EtOH, Et₂O, CHCl₃, CCl₄, Me₂CO, C₆H₆. No col. with FeCl₃.

Sen, Ray, *J. Indian Chem. Soc.*, 1932, 9, 179.

8-Hydroxyquinoline-7-aldehyde (8-Hydroxy-7-aldehydroquinoline)



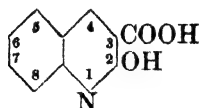
C₁₀H₇O₂N MW, 173

Red cryst. powder from EtOH-CHCl₃. M.p. above 250°. Sol. CHCl₃, AcOH. Insol. H₂O, EtOH, Me₂CO, CCl₄, C₆H₆. Greenish-yellow col. with FeCl₃.

Sen, Ray, *J. Indian Chem. Soc.*, 1932, 9, 178.

4-Hydroxyquinoline-2-carboxylic Acid.

See Kynurenine Acid. Keto form see γ -Quinolone-2-carboxylic Acid.

2-Hydroxyquinoline-3-carboxylic Acid
(Carbostyryl-3-carboxylic acid)

$C_{10}H_7O_3N$ MW, 189

Needles from EtOH or AcOH. M.p. above 320° . Mod. sol. hot EtOH, hot AcOH. Spar. sol. hot H_2O , Et_2O . Brownish-red col. with $FeCl_3$ in H_2O . $PCl_5 \rightarrow$ 2-chloroquinoline-3-carboxylic acid.

Me ester: $C_{11}H_9O_3N$. MW, 203. M.p. 186° .

Me ether: $C_{11}H_9O_3N$. MW, 203. M.p. 182° .

Et ether: $C_{12}H_{11}O_3N$. MW, 217. Needles. M.p. 133° .

Amide: $C_{10}H_9O_2N_2$. MW, 188. Needles from hot H_2O . M.p. $290-1^\circ$.

Nitrile: $C_{10}H_8ON_2$. MW, 170. Needles from EtOH. M.p. $329-31^\circ$ decomp. Sol. hot alkalis. Spar. sol. H_2O , $CHCl_3$. Insol. Et_2O .

Friedländer, Göhring, *Ber.*, 1884, 17, 459.

Stuart, *J. Chem. Soc.*, 1888, 53, 144.

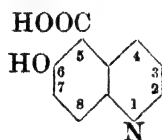
Conrad, Reinbach, *Ber.*, 1901, 34, 1342.

Heller, Wunderlich, *Ber.*, 1914, 47, 1627, 2891.

Meyer, *Monatsh.*, 1907, 28, 53.

Hydroxyquinoline-4-carboxylic Acid.

See Hydroxyeinchoninic Acid.

6-Hydroxyquinoline-5-carboxylic Acid

$C_{10}H_7O_3N$ MW, 189

Decomp. above 170° without melting (m.p. $203-4^\circ$). Prac. insol. H_2O and org. solvents. Sol. conc. acids. Heat \rightarrow 6-hydroxyquinoline.

Amide: $C_{10}H_9O_2N_2$. MW, 188. M.p. $227-5^\circ$.

Nitrile: $C_{10}H_8ON_2$. MW, 170. M.p. 293° .

Bobrański, *J. prakt. Chem.*, 1932, 134, 141.

Schmitt, Altschul, *Ber.*, 1887, 20, 2695.

8-Hydroxyquinoline-5-carboxylic Acid.

Yellow powder. M.p. 301° decomp. (273° ,

280°). Spar. sol. hot H_2O , EtOH. Prac. insol. cold H_2O , Et_2O , AcOH. Insol. Me_2CO , C_6H_6 , ligroin. Green col. with $FeCl_3$. Heat \rightarrow 8-hydroxyquinoline. $KMnO_4 \rightarrow$ quinolinic acid.

B, HCl, H_2O : m.p. 260° decomp. (239°).

$B_2, H_2SO_4, 2H_2O$: m.p. 240° .

Et ester: $C_{12}H_{11}O_3N$. MW, 217. Needles from C_6H_6 . M.p. 125° .

Anilide: m.p. $211-12^\circ$.

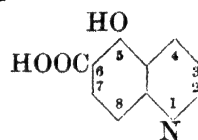
Me ether: $C_{11}H_9O_3N$. MW, 203. M.p. $225-6^\circ$ decomp.

O-Acetyl: yellow prisms from AcOEt. M.p. 312° decomp.

Niementowski, Sucharda, *Ber.*, 1916, 49, 14.

Lippmann, Fleissner, *Ber.*, 1886, 19, 2467; *Monatsh.*, 1887, 8, 311.

Matsumura, Sone, *J. Am. Chem. Soc.*, 1931, 53, 1494.

5-Hydroxyquinoline-6-carboxylic Acid

$C_{10}H_7O_3N$ MW, 189

M.p. $211-7^\circ$. Sol. AcOH. Mod. sol. MeOH, EtOH, CS_2 , C_6H_6 . Insol. Et_2O , $CHCl_3$, CCl_4 , Me_2CO . Sol. acids and alkalis.

Bogert, Fisher, *J. Am. Chem. Soc.*, 1912, 34, 1575.

8-Hydroxyquinoline-6-carboxylic Acid.

Granular powder. M.p. 284° . Spar. sol. EtOH, AcOH. Prac. insol. H_2O , Et_2O . Insol. Me_2CO , C_6H_6 . Sol. alkalis and acids. Green col. with $FeCl_3$.

B, HCl : bronze-yellow powder. M.p. 312° .

B_2, H_2SO_4, H_2O : m.p. 307° .

Et ester: $C_{12}H_{11}O_3N$. MW, 217. Needles. M.p. 147° .

Niementowski, Sucharda, *Ber.*, 1916, 49, 20.

1-[4-Hydroxy-2-quinolyl]-2-[3:4-dimethoxyphenyl]-ethane.

See Galipoline.

 ω -Hydroxyresacetophenone.

See Fisetol.

5-Hydroxysalicylic Acid.

See Gentisic Acid.

 α -Hydroxysantonin

$C_{15}H_{19}O_4$

MW, 262

Occurs in urine. Plates from EtOH. M.p. 286° decomp. Sol. hot EtOH. Spar. sol. H_2O , Et_2O , cold AcOEt. $[\alpha]_D - 115^\circ$ approx. in EtOH. Dil. $HNO_3 \rightarrow$ oxalic acid + HCN.

Acetyl: plates. M.p. 164–5°.

Phenylhydrazone: plates. M.p. 264–5°.

Lo Monaco, *Gazz. chim. ital.*, 1897, 27, ii, 87.

Jaffé, *Z. physiol. Chem.*, 1897, 22, 539.

Hecht, *ibid.*, 542.

 β -Hydroxysantonin

$C_{15}H_{18}O_4$ MW, 262

Found in the urine of rabbits. Plates from H_2O . Cryst. from $CHCl_3$ -pet. ether. M.p. 128–31°. Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. cold H_2O . Insol. pet. ether. Lævorotatory. Orange-red sols. in alc. alkalis.

Jaffé, *Z. physiol. Chem.*, 1897, 22, 553.

 γ -Hydroxysantonin.

See Artemisin.

1-Hydroxystearic Acid

$C_{18}H_{36}O_3$ MW, 300

Needles from AcOEt or $CHCl_3$. M.p. 93°. Sol. EtOH, Et_2O , hot C_6H_6 .

Et ester: $C_{20}H_{40}O_3$. MW, 328. Needles from dil. EtOH. M.p. 62–3°. Sol. Et_2O , hot EtOH. Insol. H_2O .

Amide: $C_{18}H_{37}O_2N$. MW, 299. Plates from EtOH. M.p. 148–9°. Spar. sol. hot EtOH. Insol. Et_2O , H_2O .

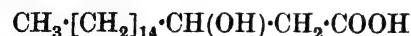
Nitrile: $C_{18}H_{35}ON$. MW, 281. Plates from pet. ether. M.p. 61.5–62.5°. Sol. EtOH, Et_2O .

Acetyl: m.p. 70–70.5°.

Me ether: $C_{19}H_{38}O_3$. MW, 314. M.p. 62.5°. B.p. 190°/5 mm.

Le Suer, *J. Chem. Soc.*, 1904, 85, 831.

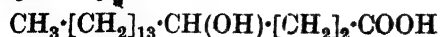
Darzens, *Compt. rend.*, 1933, 196, 348.

2-Hydroxystearic Acid

$C_{18}H_{36}O_3$ MW, 300

Plates from $CHCl_3$. M.p. 89°. Sol. Et_2O . Spar. sol. hot EtOH, $CHCl_3$.

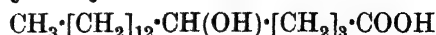
Ponzio, *Gazz. chim. ital.*, 1905, 35, II, 570.

3-Hydroxystearic Acid

$C_{18}H_{36}O_3$ MW, 300

Lactone: $C_{18}H_{34}O_2$. MW, 282. Plates from EtOH. M.p. 47–8°. Sol. EtOH, Et_2O .

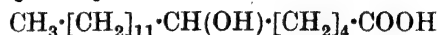
Shukow, Schestakow, *Chem. Zentr.*, 1903, I, 825.

4-Hydroxystearic Acid

$C_{18}H_{36}O_3$ MW, 300

Cryst. from EtOH. M.p. 54–5°.

Jegorow, *Chem. Zentr.*, 1915, I, 934.

5-Hydroxystearic Acid

$C_{18}H_{36}O_3$ MW, 300

Cryst. M.p. 83°. Sol. Et_2O , $CHCl_3$, C_6H_6 . Insol. pet. ether.

Acetyl: m.p. 52–3°.

Bougault, Charaux, *Compt. rend.*, 1911, 153, 573.

9-Hydroxystearic Acid

$C_{18}H_{36}O_3$ MW, 300

M.p. 74–5° (83–4°).

Me ester: $C_{19}H_{38}O_3$. MW, 314. M.p. 45–6°. B.p. 212–16°/4 mm.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, 49, 524.

10-Hydroxystearic Acid

$C_{18}H_{36}O_3$ MW, 300

Plates from EtOH. M.p. 81–2°.

Me ester: $C_{19}H_{38}O_3$. MW, 314. M.p. 53–4°. B.p. 213–17°/4 mm.

Et ester: $C_{20}H_{40}O_3$. MW, 328. M.p. 44°. Sol. EtOH, Et_2O .

Phenylhydrazide: m.p. 106–7°.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, 49, 525.

11-Hydroxystearic Acid

$C_{18}H_{36}O_3$ MW, 300

M.p. 76–7°.

Me ester: $C_{19}H_{38}O_3$. MW, 314. M.p. 49–50°. B.p. 204–6°/4 mm.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, 49, 526.

12-Hydroxystearic Acid

$C_{18}H_{36}O_3$ MW, 300

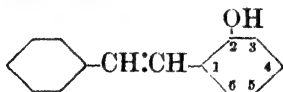
M.p. 78–9° (80.5–81°). $[\alpha]_D^{18} = 0.41^\circ$ in Py.
Me ester: $C_{19}H_{38}O_3$. MW, 314. M.p. 50–1°. B.p. 202–4°/4 mm. $[\alpha]_D^{20} = 0.32^\circ$ in Py.
 Straus, Heinze, Salzmann, *Ber.*, 1933, 66, 632.
 Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, 49, 527.

13-Hydroxystearic Acid

$C_{18}H_{36}O_3$ MW, 300
 M.p. 77–77.5°.
Me ester: $C_{19}H_{38}O_3$. MW, 314. M.p. 52–52.5°. B.p. 185–9°/2 mm.

See second reference above.

2-Hydroxystilbene (o-Styrylphenol, 1-phenyl-2-o-hydroxyphenylethylene)



$C_{14}H_{12}O$ MW, 196
 Cryst. from EtOH.Aq. M.p. 147°. Sol. H_2O and alkalis with green fluor.
Acetyl: needles from EtOH.Aq. M.p. 54–5°.

Me ether: $C_{15}H_{14}O$. MW, 210. Plates from EtOH.Aq. M.p. 70°.

Funk, v. Kostanecki, *Ber.*, 1905, 38, 940.

v. Kostanecki, Tambor, *Ber.*, 1909, 42, 826.

3-Hydroxystilbene (m-Styrylphenol, 1-phenyl-2-m-hydroxyphenylethylene).

Needles from H_2O . Very sol. H_2O , EtOH, Et_2O . $FeCl_3 \rightarrow$ dark red col.

Werner, *Ber.*, 1895, 28, 1999.

4-Hydroxystilbene (p-Styrylphenol, 1-phenyl-2-p-hydroxyphenylethylene).

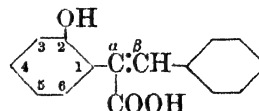
Plates from C_6H_6 or AcOH. M.p. 189° (184.5°). Very sol. EtOH. Sol. Et_2O , AcOH, C_6H_6 . Spar. sol. ligroin. Red sol. in H_2SO_4 .
Acetyl: needles from EtOH. M.p. 152°. Sol. EtOH, AcOH.

Me ether: exists in two forms. (i) *Solid, stable form*: white plates from EtOH. M.p. 135–6° very sol. Et_2O , warm EtOH, Me_2CO , C_6H_6 , AcOH. Passes readily into the liquid form on ultraviolet irradiation. (ii) *Liquid, labile form*: b.p. 143–5°/1.5 mm. Dist. at 15 mm. \rightarrow solid form.

Stoermer, Prigge, *Ann.*, 1915, 409, 33.

Hewitt, Lewcock, Pope, *J. Chem. Soc.*, 1912, 101, 606.

2-Hydroxystilbene- α -carboxylic Acid (2-Phenyl-1-o-hydroxyphenylacrylic acid, α -o-hydroxyphenylcinnamic acid)



$C_{15}H_{12}O_3$ MW, 240

Plates from EtOH.Aq. M.p. 155°.

Me ether: $C_{16}H_{14}O_3$. MW, 254. Needles from EtOH.Aq. M.p. 145–6°.

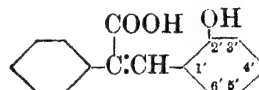
Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, 42, 834.

4-Hydroxystilbene- α -carboxylic Acid (2-Phenyl-1-p-hydroxyphenylacrylic acid, α -p-hydroxyphenylcinnamic acid).

Me ether: needles from C_6H_6 -ligroin. M.p. 132–3°. Sol. org. solvents. Red sol. in conc. H_2SO_4 . $KMnO_4 \rightarrow$ benzaldehyde.

Jörlander, *Ber.*, 1917, 50, 413.

2'-Hydroxystilbene- α -carboxylic Acid (1-Phenyl-2-o-hydroxyphenylacrylic acid, 2-hydroxy- α -phenylcinnamic acid)



$C_{15}H_{12}O_3$ MW, 240

Me ether: $C_{16}H_{14}O_3$. MW, 254. Needles from EtOH. M.p. 186–7°. Dist. \rightarrow 3-phenylcoumarin.

Acetyl: needles from H_2O . Decomp. at 170–80°. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Nitrile: $C_{15}H_{11}ON$. MW, 221. Yellow needles from MeOH.Aq. M.p. 104°. Acids, alkalis, or hot $H_2O \rightarrow$ 3-phenylcoumarin.

Et ether: $C_{17}H_{15}ON$. MW, 249. Needles from EtOH.Aq. M.p. 82°. Sol. org. solvents. Insol. H_2O , ligroin.

Ogialoro, *Gazz. chim. ital.*, 1879, 9, 428.

Funk, v. Kostanecki, *Ber.*, 1905, 38, 940.

Borsche, Streitberger, *Ber.*, 1904, 37, 3165.

Bistrzycki, Stelling, *Ber.*, 1901, 34, 3087.

3'-Hydroxystilbene- α -carboxylic Acid (1-Phenyl-2-m-hydroxyphenylacrylic acid, 3-hydroxy- α -phenylcinnamic acid).

Needles from H_2O . M.p. 172–3°. Sol. EtOH, Et_2O , AcOH. Spar. sol. H_2O . At 240° \rightarrow 3-hydroxystilbene.

Et ester: $C_{17}H_{16}O_3$. MW, 268. Cryst. from EtOH.Aq. M.p. 183°.

Me ether: needles from EtOH. M.p. 189°.

Nitrile: leaflets from AcOH.Aq. M.p. 106-7°. Sol. EtOH, hot C₆H₆, AcOH. Spar. sol. CS₂. **Et ether**: leaflets from EtOH. M.p. 72°. Sol. EtOH, C₆H₆, CS₂. **Acetyl**: needles from EtOH. M.p. 75-6°.

Werner, *Ber.*, 1895, **28**, 1998.

Bistrzycki, Stelling, *Ber.*, 1901, **34**, 3085.

Funk, v. Kostanecki, *Ber.*, 1905, **38**, 940 (Note).

Mayer, Balle, *Ann.*, 1914, **403**, 203.

4'-Hydroxystilbene- α -carboxylic Acid (1-Phenyl-2-p-hydroxyphenylacrylic acid, 4-hydroxy- α -phenylcinnamic acid).

Needles from EtOH. M.p. 223° decomp. Sol. EtOH, Et₂O, Me₂CO, AcOH. Spar. sol. C₆H₆, pet. ether.

Me ester: C₁₆H₁₄O₃. MW, 254. Plates from EtOH. M.p. 168-9°. Sol. EtOH, Et₂O, AcOH. **Acetyl**: needles. M.p. 108°. Sol. EtOH, Et₂O, AcOH.

Me ether: exists in two forms. (i) Cryst. from C₆H₆. M.p. 189°. Dist. \rightarrow 4-methoxystilbene. **Amide**: C₁₆H₁₅O₂N. MW, 253. Plates from C₆H₆-pet. ether. M.p. 131.5-132.5°. **Nitrile**: C₁₆H₁₃ON. MW, 235. Needles from EtOH. M.p. 93°. (ii) Cryst. from C₆H₆. M.p. 123°. **Amide**: needles from CHCl₃-pet. ether. M.p. 168-9°.

Acetyl: needles from C₆H₆. M.p. 174°. Sol. EtOH, Et₂O, AcOH.

Nitrile: exists in two forms. (i) Cryst. from EtOH.Aq. M.p. 190-1°. Spar. sol. cold AcOH. Insol. C₆H₆, CHCl₃, CS₂. **Acetyl**: plates from EtOH. M.p. 121-2°. (ii) Needles from EtOH.Aq. M.p. 192°. Sol. usual org. solvents.

Zincke, Geibel, *Ann.*, 1906, **349**, 110.

Bistrzycki, Stelling, *Ber.*, 1901, **34**, 3084.

Hewitt, Lewcock, Pope, *J. Chem. Soc.*, 1912, **101**, 606.

Stoermer, Prigge, *Ann.*, 1915, **409**, 30.

Bodroux, *Compt. rend.*, 1911, **153**, 350.

o-Hydroxystyrene (o-Vinylphenol, o-hydroxyphenylethylene)



C₈H₈O

MW, 120

Needles. M.p. 29-29.5°. B.p. 77°/15 mm., 56°/4 mm. Very sol. most org. solvents. Readily polymerises on standing in air. D₄^{18.2} 1.0609 (supercooled), D₄^{25.5} 1.0468. n_D^{25.7} 1.577.

Me ether: o-methoxystyrene, o-vinylanisole. C₉H₁₀O. MW, 134. B.p. 83-4°/12 mm. D₄^{17.2} 1.0049. n_D^{17.4} 1.557.

Auwers, *Ann.*, 1917, **413**, 296.

Smith, Niederl, *J. Am. Chem. Soc.*, 1931, **53**, 807.

m-Hydroxystyrene (m-Vinylphenol, m-hydroxyphenylethylene).

Oil. B.p. 114-16°/16-17 mm.

Me ether: m-methoxystyrene, m-vinylanisole. B.p. 89-90°/14 mm.

Komppa, *Ber.*, 1893, **26**, (Ref.), 677.

Klages, Eppelsheim, *Ber.*, 1903, **36**, 3592.

p-Hydroxystyrene (p-Vinylphenol, p-hydroxyphenylethylene).

Me ether: p-methoxystyrene, p-vinylanisole. B.p. 204-5°/756 mm., 95-6°/16 mm., 90-1°/13 mm. D₄¹³ 1.0001. n_D 1.5642. Polymerises readily.

Et ether: p-ethoxystyrene, p-vinylphenetole. C₁₀H₁₂O. MW, 148. Cryst. B.p. 108-10°/12 mm. D₄¹⁸ 0.9764.

Klages, Eppelsheim, *Ber.*, 1903, **36**, 3594.

Tiffeneau, *Ann. chim.*, 1907, **10**, 349.

Mannich, Jacobsohn, *Ber.*, 1910, **43**, 195.

p-Hydroxystyrylacetic Acid (3-p-Hydroxyphenylvinylacetic acid, 2-p-hydroxybenzylidene-propionic acid)



C₁₀H₁₀O₃

MW, 178

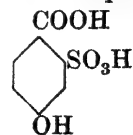
Me ether: 2-anisylidenepropionic acid, 2-p-methoxybenzylidenepropionic acid. Plates from H₂O. M.p. 106.5°. Very sol. EtOH, Et₂O, CHCl₃. Sol. CS₂.

Fittig, Politis, *Ann.*, 1889, **255**, 293.

Hydroxysuccinic Acid.

See Malic Acid.

4-Hydroxy-2-sulphobenzoic Acid (p-Hydroxybenzoic acid o-sulphonic acid)



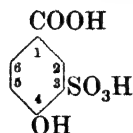
C₇H₆O₆S

MW, 218

Me ether: 4-methoxy-2-sulphobenzoic acid, anisic acid o-sulphonic acid, 2-sulphoanisic acid. C₈H₈O₆S. MW, 232. Cryst. + 2½H₂O. M.p. anhyd. 104°.

Hedrick, *Am. Chem. J.*, 1887, **9**, 415.

Moale, *Am. Chem. J.*, 1898, **20**, 291.

4-Hydroxy-3-sulphobenzoic Acid (p-Hydroxybenzoic acid m-sulphonic acid) $C_7H_6O_6S$

MW, 218

Needles or plates. Sol. H_2O , EtOH. Insol. Et_2O . $FeCl_3 \rightarrow$ bluish-red col. KOH fusion \rightarrow protocatechuic acid.

Me ether: 4-methoxy-3-sulphobenzoic acid, anisic acid m-sulphonic acid, 3-sulphoanisic acid. $C_8H_8O_6S$. MW, 232. Needles + $1\frac{1}{2}H_2O$. M.p. 236° decomp. Sol. EtOH, H_2O . Insol. Et_2O . *Sulphonamide*: $C_8H_9O_5NS$. MW, 231. Needles or plates from EtOH. M.p. $276-7^\circ$. Spar. sol. H_2O .

Sulphonamide: $C_7H_7O_5NS$. MW, 217. Prisms from EtOH. M.p. 258° . Sol. H_2O . *Et ether*: $C_9H_{11}O_5NS$. MW, 245. Needles from H_2O . M.p. $230-1^\circ$ decomp.

Klepl, *J. prakt. Chem.*, 1883, **28**, 196.

Metcalf, *Am. Chem. J.*, 1893, **15**, 309.

Alleman, *Am. Chem. J.*, 1904, **31**, 41.

Pfeiffer, Negreanu, *Ber.*, 1917, **50**, 1472.

5-Hydroxy-3-sulphobenzoic Acid (m-Hydroxybenzoic acid 5-sulphonic acid).

Needles + $1H_2O$ from H_2O . Decomp. at 120° . Sol. EtOH, Et_2O . KOH fusion \rightarrow 3:5-dihydroxybenzoic acid.

Hopfgartner, *Monatsh.*, 1873, **14**, 694.

6-Hydroxy-3-sulphobenzoic Acid (o-Hydroxybenzoic acid 5-sulphonic acid, salicylic acid 5-sulphonic acid, 5-sulphosalicylic acid).

Needles + $2H_2O$ from H_2O . M.p. anhyd. 120° . Sol. H_2O , EtOH, Et_2O . Hygroscopic. Above m.p. \rightarrow salicylic acid + phenol.

Di-Et ester: $C_{11}H_{14}O_6S$. MW, 274. Cryst. from EtOH. M.p. 56° . Insol. H_2O .

Di-phenyl ester: $C_{19}H_{14}O_6S$. MW, 370. Needles from EtOH. M.p. $172-3^\circ$. Insol. H_2O . $FeCl_3 \rightarrow$ brown col.

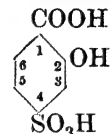
Sulphonchloride: $C_7H_5O_5ClS$. MW, 236.5. Needles from C_6H_6 . M.p. $171-2^\circ$ decomp. Sol. Et_2O . Spar. sol. C_6H_6 . *Me ester*: $C_8H_7O_5ClS$. MW, 250.5. Cryst. from ligroin. M.p. $82-3^\circ$.

Sulphonamide: $C_7H_7O_5NS$. MW, 217. Plates from EtOH. M.p. $253-5^\circ$ decomp.

Cohn, *J. prakt. Chem.*, 1900, **61**, 545.

Hirsch, *Ber.*, 1900, **33**, 3238.

Bayer, D.R.P., 264,786, (*Chem. Zentr.*, 1913, II, 1350); D.R.P., 276,331, (*Chem. Zentr.*, 1914, II, 280).

2-Hydroxy-4-sulphobenzoic Acid (o-Hydroxybenzoic acid p-sulphonic acid, salicylic acid 4-sulphonic acid, 4-sulphosalicylic acid) $C_7H_6O_6S$

MW, 218

Sulphonamide: $C_7H_7O_5NS$. MW, 217. Needles. M.p. 231° decomp. $FeCl_3 \rightarrow$ red col. *Me ether*: 2-methoxy-4-sulphobenzoic acid. $C_8H_9O_5NS$. MW, 231. Cryst. M.p. 211° .

Bromwell, *Am. Chem. J.*, 1897, **19**, 574.

Walker, *ibid.*, 578.

3-Hydroxy-4-sulphobenzoic Acid (m-Hydroxybenzoic acid p-sulphonic acid).

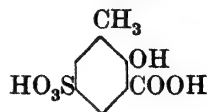
Yellowish-green needles + $2\frac{1}{2}(1\frac{1}{2})H_2O$ from H_2O . M.p. 206° ($212-14^\circ$). Sol. EtOH. Insol. Et_2O . $FeCl_3 \rightarrow$ wine-red col.

Me ether: 3-methoxy-4-sulphobenzoic acid. $C_8H_8O_6S$. MW, 232. Plates + $2H_2O$ from H_2O . M.p. 228° . *Sulphonchloride*: $C_8H_7O_5ClS$. MW, 250.5. Plates from toluene. M.p. 214° . Spar. sol. org. solvents. *Dichloride*: $C_8H_6O_4Cl_2S$. MW, 269. Plates from CCl_4 . M.p. 87° . Sol. C_6H_6 , toluene. *Sulphonamide*: $C_8H_9O_5NS$. MW, 231. Plates from EtOH. Aq. M.p. 290° decomp. Sol. EtOH, MeOH, Me_2CO . Mod. sol. hot H_2O . Spar. sol. C_6H_6 , toluene. *Diamide*: $C_8H_{10}O_4N_2S$. MW, 230. Needles or plates from H_2O . M.p. 255° .

Senhofer, *Ann.*, 1869, **152**, 102.

Ishihara, *Journal of the Pharmaceutical Society, Japan*, 1930, **50**, 132.

Shah, *J. Chem. Soc.*, 1930, 1295.

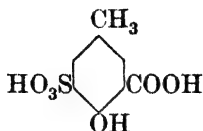
2-Hydroxy-5-sulpho-m-toluic Acid (5-Sulpho-o-cresotic acid, 5-sulpho-o-cresotinic acid) $C_8H_6O_6S$

MW, 232

Sulphonchloride: $C_8H_7O_5ClS$. MW, 250.5. Cryst. from toluene. M.p. $179-80^\circ$.

Bayer, D.R.P., 264,786, (*Chem. Zentr.*, 1913, II, 1350).

4-Hydroxy-5-sulpho-*m*-toluic Acid (5-Sulpho-*p*-cresotic acid, 5-sulpho-*p*-cresotinic acid)



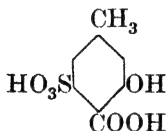
$C_8H_8O_6S$

MW, 232

Sulphonchloride: $C_8H_7O_5ClS$. MW, 250.5. Prisms from toluene. M.p. 189–90°.

See previous reference.

3-Hydroxy-5-sulpho-*p*-toluic Acid (5-Sulpho-*m*-cresotic acid, 5-sulpho-*m*-cresotinic acid)



$C_8H_8O_6S$

MW, 232

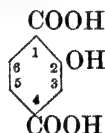
Sulphonchloride: $C_8H_7O_5ClS$. MW, 250.5. Prisms from toluene. M.p. 172–3°.

See previous reference.

3-Hydroxyterephthalaldehydic Acid.

See 3-Hydroxy-4-aldehydobenzoic Acid.

Hydroxyterephthalic Acid



$C_8H_6O_5$

MW, 182

Cryst. powder from H_2O . M.p. above 300°. Very sol. MeOH, EtOH. Sol. Et_2O . Spar. sol. H_2O . Part. sublimes. k (first) = 2.5×10^{-3} ; (second) = 4.5×10^{-5} . $FeCl_3 \rightarrow$ violet-red col. Dist. \rightarrow phenol.

1-Me ester: $C_9H_8O_5$. MW, 196. Needles. M.p. 206–8°. Very sol. EtOH, Et_2O . Sol. hot C_6H_6 . Less sol. $CHCl_3$ than 4-Me ester. $k = 2.5 \times 10^{-4}$ at 25°.

4-Me ester: needles. M.p. 175–176.5°. Very sol. EtOH, Et_2O . Sol. hot C_6H_6 . $k = 2.7 \times 10^{-3}$ at 25°.

Di-Me ester: $C_{10}H_{10}O_5$. MW, 210. Needles from MeOH. M.p. 94°. Very sol. EtOH, Et_2O . Sol. hot H_2O . *Acetyl*: needles from EtOH. M.p. 76°.

Me ether: methoxyterephthalic acid. $C_9H_8O_5$. MW, 196. Prisms from H_2O . M.p. 274–5° (276–9°). Very sol. EtOH. Sol. Et_2O . Spar. sol. H_2O , $CHCl_3$, C_6H_6 . *Di-Me ester*:

$C_{11}H_{12}O_5$. MW, 224. Needles from MeOH. M.p. 71–5°.

Et ether: ethoxyterephthalic acid. $C_{10}H_{10}O_5$. MW, 210. Cryst. M.p. 253–4°. Very sol. EtOH. Sol. Et_2O , C_6H_6 , hot H_2O . Insol. cold H_2O .

Benzyl ether: $C_{15}H_{18}O_5$. MW, 272. Needles from EtOH. M.p. 230–40°.

Hähle, *J. prakt. Chem.*, 1891, **44**, 14.

Wegscheider, *Monatsh.*, 1902, **23**, 333, 382.

Baeyer, Tutein, *Ber.*, 1889, **22**, 2187.

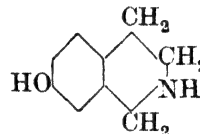
Paternò, Canzoneri, *Gazz. chim. ital.*, 1879, **9**, 460.

Burkhard, *Ber.*, 1877, **10**, 147.

Hydroxytetracosane.

See Tetracosanol.

7-Hydroxy-1:2:3:4-tetrahydroisoquinoline



$C_9H_{11}ON$

MW, 149

B.p. 210–20°/18 mm. Sol. EtOH with violet fluor. Spar. sol. Et_2O . Zn dust dist. \rightarrow isoquinoline.

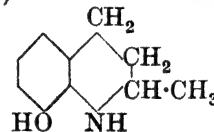
Picrate: m.p. 198–201°.

Pictet, Spengler, *Ber.*, 1911, **44**, 2036.

Hydroxytetrahydronaphthalene.

See Tetrahydronaphthol.

8-Hydroxy-1:2:3:4-tetrahydroquin-aldine (8-Hydroxy-2-methyl-1:2:3:4-tetrahydroquinoline)



$C_{10}H_{13}ON$

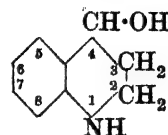
MW, 163

B.p. 278–82°.

Me ether: $C_{11}H_{15}ON$. MW, 177. B.p. 270°. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Döbner, Miller, *Ber.*, 1884, **17**, 1706.

4-Hydroxy-1:2:3:4-tetrahydroquinoline



$C_9H_{11}ON$

MW, 149

Prisms. M.p. 83–4°. Sol. warm H₂O and most org. solvents. Sol. cold conc. H₂SO₄ to pale red sol.

Diacetyl: prisms from ligroin. M.p. 95–6°.

Clemo, Perkin, *J. Chem. Soc.*, 1924, 125, 1620.

5-Hydroxy-1:2:3:4-tetrahydroquinoline.

Needles from C₆H₆. M.p. 116–17°. Sol. EtOH, Et₂O. Mod. sol. hot H₂O. Spar. sol. C₆H₆. Prac. insol. ligroin. Sublimes. Gives dark red col. with FeCl₃. Aq. in aq. sol.

Et ether: C₁₁H₁₅ON. MW, 177. Cryst. from Et₂O. M.p. 73°. Sol. EtOH, C₆H₆. Spar. sol. H₂O, ligroin.

Riemerschmied, *Ber.*, 1883, 16, 723.

6-Hydroxy-1:2:3:4-tetrahydroquinoline.

M.p. 148°. Sol. acids and caustic alkalis.

Me ether: see Thalline.

Acetyl: needles. M.p. 82°.

Badische, D.R.P., 42,871.

8-Hydroxy-1:2:3:4-tetrahydroquinoline.

Prisms from C₆H₆. M.p. 122.5°. Sol. EtOH, C₆H₆. Mod. sol. hot H₂O. Spar. sol. ligroin. Sublimes. Non-volatile in steam. Reddish-brown col. with FeCl₃. Aq. in aq. sol.

Et ether: b.p. 275–6°/716 mm.

N-Me: see Kairine.

N-Et: see Kairine A.

Bedall, Fischer, *Ber.*, 1881, 14, 1368.

Hydroxytetralin.

See Tetrahydronaphthol.

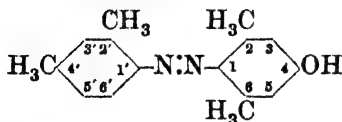
Hydroxytetramethylammonium hydroxide.

See Formocholine.

Hydroxytetramethylammonium iodide.

See under Formocholine.

4-Hydroxy-2:6:2':4'-tetramethylazobenzene (m-Xyleneazo-m-5-xyleneol)



C₁₆H₁₈ON₂ MW, 254

Orange-yellow cryst. from pet. ether. M.p. 124–5°. Sol. dil. alkalis.

Auwers, Michaelis, *Ber.*, 1914, 47, 1292.

4-Hydroxy-1:2:3:5-tetramethylbenzene.

See Isodurenol.

3-Hydroxytetrolic Acid (Hydroxymethylpropionic acid)



C₄H₄O₃ MW, 100

Cryst. from C₆H₆. M.p. 115–16°. Very sol. EtOH, H₂O, Me₂CO, AcOH. Sol. Et₂O. Spar. sol. CHCl₃, ligroin, C₆H₆.

Et ester: C₆H₈O₃. MW, 128. B.p. 126–7°/14 mm.

Dibromide: m.p. 137–9°.

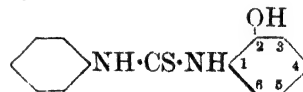
Lespieau, Viguier, *Compt. rend.*, 1908, 146, 295.

Lespieau, *Ann. chim.*, 1912, 27, 178.

Hydroxythioanisole.

See under Thiohydroquinone and Thioresorcinol.

o-Hydroxythiocarbanilide (2-Hydroxy-sym.-diphenylthiourea)



C₁₃H₁₂ON₂S MW, 244

Plates from 95% EtOH. M.p. 146°.

Me ether: C₁₄H₁₄ON₂S. MW, 258. M.p. 126°.

Otterbracher, Whitmore, *J. Am. Chem. Soc.*, 1929, 51, 1909.

Kalckhoff, *Ber.*, 1883, 16, 1829.

m-Hydroxythiocarbanilide (3-Hydroxy-sym.-diphenylthiourea).

Plates from EtOH. M.p. 155–6°.

Meyer, Sundmacher, *Ber.*, 1899, 32, 2116.

p-Hydroxythiocarbanilide (4-Hydroxy-sym.-diphenylthiourea).

Plates from Et₂O. M.p. 162°. Sol. EtOH, alkalis. Spar. sol. Et₂O, C₆H₆, H₂O, dil. acids.

Me ether: m.p. 138°.

Acetyl: m.p. 137°.

Otterbracher, Whitmore, *J. Am. Chem. Soc.*, 1929, 51, 1909.

Kalckhoff, *Ber.*, 1883, 16, 1831.

3-Hydroxythionaphthene.

See Thioindoxyl.

3-Hydroxythionaphthene-2-carboxylic Acid.

See Thioindoxyl.

Hydroxythionaphthol.

See Mercaptonaphthol.

Hydroxythiophenetole.

See under Thiohydroquinone.

Hydroxythiophenol.

See Thiocatechol, Thiohydroquinone, and Thiorescinol.

 ω -Hydroxytoluene.

See Benzyl Alcohol.

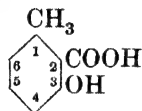
Hydroxytoluene.

See Cresol.

 ω -Hydroxytoluic Acid.

See Hydroxymethyl-benzoic Acid.

3-Hydroxy-*o*-toluic Acid (6-Hydroxy-2-methylbenzoic acid, β -*m*-homosalicylic acid, *m*-cresol-2-carboxylic acid, 6-methylsalicylic acid)



$C_8H_8O_3$

MW, 152

Needles from $CHCl_3$. M.p. $170-1^\circ$ (168°). Sol. hot H_2O , EtOH, Et_2O . Mod. sol. $CHCl_3$. $k = 1.06 \times 10^{-3}$ at 25° . $FeCl_3 \rightarrow$ violet col. Volatile in steam. Sublimes in high vacuum.

Me ester: $C_9H_{10}O_3$. MW, 166. Prisms or needles. M.p. 139° . No col. with $FeCl_3$.

Acetyl: prisms from C_6H_6 . M.p. 131° . No col. with $FeCl_3$.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, 35, 139.

Simonis, *Ber.*, 1917, 50, 783.

Asahina, Furukawa, *Journal of the Pharmaceutical Society, Japan*, 1917, 429, 967.

Asahina, Kondo, *Journal of the Pharmaceutical Society, Japan*, 1922, 482, 264.

Anslow, Raistrick, *Biochem. J.*, 1931, 25, 39.

4-Hydroxy-*o*-toluic Acid (5-Hydroxy-2-methylbenzoic acid, *p*-cresol-2-carboxylic acid).

Needles or prisms from H_2O . M.p. $183-4^\circ$ (179°). Sol. EtOH, Et_2O . Mod. sol. H_2O . Spar. sol. $CHCl_3$. $FeCl_3 \rightarrow$ brown ppt. Volatile in steam. Sublimes.

Me ester: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. $74.5-75^\circ$.

Et ester: $C_{10}H_{12}O_3$. MW, 180. Cryst. M.p. 67° .

Me ether: needles from H_2O . M.p. 146° .

Jacobsen, *Ber.*, 1884, 17, 163.

Einhorn, Pfyl, *Ann.*, 1900, 311, 57.

Auwers, *Z. physik. Chem.*, 1895, 18, 611.

See also third reference above.

5-Hydroxy-*o*-toluic Acid (4-Hydroxy-2-methylbenzoic acid, *m*-cresol-6-carboxylic acid).

Needles + $\frac{1}{2}H_2O$ from H_2O . M.p. anhyd.

$177-8^\circ$. Sol. hot H_2O , EtOH, Et_2O . Insol. $CHCl_3$. At $200^\circ \rightarrow$ *m*-cresol + CO_2 . No col. with $FeCl_3$.

Et ester: needles from ligroin. M.p. 98° (92°). B.p. 300° . No col. with $FeCl_3$.

Me ether: 2-methylanisic acid. Needles from H_2O . M.p. 176° . *Me ester*: $C_{10}H_{12}O_3$. MW, 180. Oil. Volatile in steam.

Et ether: $C_{10}H_{12}O_3$. MW, 180. Needles from H_2O . M.p. 146° .

Tiemann, Schotten, *Ber.*, 1878, II, 778.

Schall, *Ber.*, 1879, 12, 819.

Eijkmann, *Chem. Zentr.*, 1904, I, 1597.

Claissen, *Ann.*, 1897, 297, 46.

Gomberg, Johnson, *J. Am. Chem. Soc.*, 1917, 39, 1679.

6-Hydroxy-*o*-toluic Acid (3-Hydroxy-2-methylbenzoic acid, *o*-cresol-6-carboxylic acid).

Cryst. from H_2O . M.p. $145-6^\circ$ (142°). KOH fusion \rightarrow *o*-cresol.

Me ester: cryst. M.p. $74.5-75.5^\circ$.

Et ester: prisms. M.p. 69° .

Nitrite: C_8H_7ON . MW, 133. Needles from H_2O . M.p. 195° .

Acetyl: needles. M.p. 144.5° .

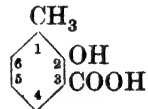
Baudisch, Perkin, *J. Chem. Soc.*, 1909, 95, 1885.

Einhorn, Pfyl, *Ann.*, 1900, 311, 52.

Auwers, *Z. physik. Chem.*, 1895, 18, 611 (Note).

Noelting, *Ber.*, 1904, 37, 1027.

2-Hydroxy-*m*-toluic Acid (*o*-Cresotic acid, *o*-cresotinic acid, *o*-homosalicylic acid, 2-hydroxy-3-methylbenzoic acid, *o*-cresol-3-carboxylic acid, 3-methylsalicylic acid)



$C_8H_8O_3$

MW, 152

Needles from H_2O or EtOH.Aq. M.p. $163-4^\circ$. Sol. hot H_2O , EtOH, Et_2O , $CHCl_3$. $k = 1.018 \times 10^{-3}$ at 25° . $FeCl_3 \rightarrow$ intense violet col. Conc. HCl at $210^\circ \rightarrow$ *o*-cresol + CO_2 .

Me ester: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. $28-30^\circ$. B.p. 235° , $111^\circ/13$ mm. D 20 1.1683, D $^{16.5}$ 1.529. $n_D^{16.5}$ 1.5354.

Et ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 242° .

Phenyl ester: $C_{14}H_{12}O_3$. MW, 228. Needles. M.p. 48° .

p-Nitrobenzyl ester: $C_{15}H_{13}O_5N$. MW, 287. Cryst. M.p. 98.5° .

Phenacyl ester: $C_{18}H_{14}O_4$. MW, 270. Cryst. from EtOH.Aq. M.p. 138.5° .

Acetyl: needles from C_6H_6 . M.p. 113°.

Chloride: $C_8H_7O_2Cl$. MW, 170.5. Cryst. M.p. 27–8°. B.p. 87–9°/16 mm. Easily decomp. **Acetyl**: cryst. M.p. 48–9°.

Amide: $C_8H_7O_2N$. MW, 151. Needles from EtOH.Aq. M.p. 112°. **Oxime**: plates from H_2O . M.p. 126.5°. Sol. hot H_2O , EtOH, C_6H_6 , $CHCl_3$. Insol. ligroin.

Nitrile: C_8H_7ON . MW, 133. Plates from EtOH. M.p. 88.5°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. H_2O . Insol. ligroin.

Me ether: $C_9H_{10}O_3$. MW, 166. Needles from H_2O . M.p. 85°. **Me ester**: $C_{10}H_{12}O_3$. MW, 180. B.p. 249.5–250.5°/763 mm., 129–31°/14 mm. D_0^{20} 1.1258, $D_0^{17.4}$ 1.1102. $n_D^{17.4}$ 1.5166.

Paschen, *Ber.*, 1891, **24**, 3669.

Anschutz, Schroeder, Weber, Anspach, *Ann.*, 1906, **346**, 343.

Anschutz, Scholl, *Ann.*, 1911, **379**, 340.

Lyons, Reid, *J. Am. Chem. Soc.*, 1917, **39**, 1737.

Rather, Reid, *J. Am. Chem. Soc.*, 1919, **41**, 83.

4-Hydroxy-*m*-toluic Acid (*p*-Cresotic acid, *p*-cresotinic acid, *p*-homosalicylic acid, 6-hydroxy-3-methylbenzoic acid, *p*-cresol-3-carboxylic acid, 5-methylsalicylic acid).

Needles from H_2O or pet. ether. M.p. 153° (151°). Sol. hot H_2O , EtOH, Et_2O , $CHCl_3$. $k = 8.41 \times 10^{-5}$ at 25°. Volatile in steam. $FeCl_3 \rightarrow$ violet col.

Me ester: f.p. –1°. B.p. 242°, 122–4°/14 mm. D_0^{20} 1.1673, $D_0^{15.8}$ 1.1534. $n_D^{15.8}$ 1.5351. Insol. H_2O .

Et ester: b.p. 251°.

Phenyl ester: needles from EtOH. M.p. 92–3°.

p-Nitrobenzyl ester: cryst. from EtOH.Aq. M.p. 147°.

Phenacyl ester: cryst. from EtOH.Aq. M.p. 145.5°.

Acetyl: needles or prisms from C_6H_6 . M.p. 151–3°.

Propionyl: plates or needles from C_6H_6 . M.p. 136–40°.

Chloride: **acetyl**, cryst. from Et_2O . M.p. 47°. B.p. 148–50°/16 mm. decomp. Sol. C_6H_6 , $CHCl_3$.

Amide: needles from EtOH. M.p. 177–8°.

Et ether: $C_{10}H_{13}O_2N$. MW, 179. Needles from EtOH.Aq. M.p. 152°. **Oxime**: needles from H_2O , plates from C_6H_6 . M.p. 123–4°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. H_2O . Insol. ligroin.

Nitrile: cryst. M.p. 100–1°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. ligroin. **Acetyl**: cryst. from Et_2O . M.p. 56–7°. Sol. EtOH, Et_2O , Me_2CO , C_6H_6 , $CHCl_3$, hot ligroin. Spar. sol. H_2O .

Me ether: needles from H_2O . M.p. 69°. **Me ester**: b.p. 263–5°, 143–6°/14 mm. D_0^{20} 1.1430, $D_0^{17.2}$ 1.1287. $n_D^{17.2}$ 1.5311. **Amide**: $C_9H_{11}O_2N$. MW, 165. Needles from EtOH.Aq. M.p. 163°. **Nitrile**: C_9H_9ON . MW, 147. Yellow oil. B.p. 270°.

Schering, D.R.P., 138,563, (*Chem. Zentr.*, 1903, I, 372).

Zeltner, Landau, D.R.P., 258,887, (*Chem. Zentr.*, 1913, I, 1641).

Guillaumin, *Bull. soc. chim.*, 1910, **7**, 337.

Gattermann, *Ann.*, 1888, **244**, 66.

Auwers, *Ber.*, 1916, **49**, 821.

See also last two references above.

5-Hydroxy-*m*-toluic Acid (5-Hydroxy-3-methylbenzoic acid, *m*-cresol-5-carboxylic acid).

Needles from H_2O . M.p. 210°. Non-volatile in steam. Sublimes. No col. with $FeCl_3$.

Me ester: plates from EtOH.Aq. M.p. 92–3°. Spar. volatile in steam.

Me ether: needles from AcOH. M.p. 134°.

Me ester: oil. B.p. 262–8°/752 mm.

Jacobsen, *Ber.*, 1881, **14**, 2357.

Meldrum, *J. Chem. Soc.*, 1911, **99**, 1716.

Liebermann, Voswinckel, *Ber.*, 1897, **30**, 1742.

6-Hydroxy-*m*-toluic Acid (4-Hydroxy-3-methylbenzoic acid, *o*-cresol-5-carboxylic acid).

Needles + $\frac{1}{2}H_2O$ from H_2O . M.p. anhyd. 174–5°. Sol. hot H_2O , EtOH, Et_2O . Spar. sol. hot $CHCl_3$. No col. with $FeCl_3$.

Et ester: needles from C_6H_6 -ligroin. M.p. 98–9°. Sol. org. solvents.

Nitrile: C_9H_7ON . MW, 133. Needles from H_2O . M.p. 93°. Sol. EtOH, C_6H_6 , $CHCl_3$. Insol. ligroin.

Acetyl: plates from EtOH.Aq. M.p. 75–6°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Insol. H_2O , ligroin.

Me ether: 3-methylanisic acid. Needles from H_2O . M.p. 193°. **Me ester**: plates from EtOH.Aq. M.p. 67°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. H_2O . **Amide**: $C_9H_{11}O_2N$. MW, 165. Cryst. from EtOH.Aq. M.p. 144°.

Et ether: $C_{10}H_{13}O_3$. MW, 180. Needles from EtOH. M.p. 200–1° (198°). Volatile in steam. **Et ester**: $C_{12}H_{16}O_3$. MW, 208. B.p. 274–5°. D_0^{20} 1.057. $n_D^{18.1}$ 1.519. **Amide**:

$C_{10}H_{13}O_2N$. MW, 179. Needles from EtOH.Aq. M.p. 167°.

Schall, *Ber.*, 1879, **12**, 819.

Gattermann, Hess, *Ann.*, 1888, **244**, 65.

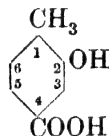
Gattermann, *Ann.*, 1907, **357**, 355.

Meldrum, Perkin, *J. Chem. Soc.*, 1909, **95**, 1894.

Auwers, *Ber.*, 1906, **39**, 3174; *Ann.*, 1918, **415**, 158.

Paschen, *Ber.*, 1891, **24**, 3673.

2-Hydroxy-*p*-toluic Acid (3-Hydroxy-4-methylbenzoic acid, *o*-cresol-4-carboxylic acid)



$C_8H_8O_3$ MW, 152

Needles or prisms from H_2O . M.p. 206–7°. Sol. hot H_2O , EtOH, Et₂O. Spar. sol. C_6H_6 , pet. ether. Sublimes. Spar. volatile in steam. No col. with $FeCl_3$.

Me ether: $C_9H_{10}O_3$. MW, 166. Needles. M.p. 156°. Sol. EtOH, Et₂O. Insol. H_2O .

Et ether: $C_{10}H_{12}O_3$. MW, 180. Cryst. M.p. 74–5°.

Acetyl: needles from C_6H_6 . M.p. 162°.

Nitrile: C_8H_7ON . MW, 133. Needles from EtOH.Aq. M.p. 99–5°.

v. Gerichten, *Ber.*, 1878, **11**, 368, 1589.

Perkin, *J. Chem. Soc.*, 1898, **73**, 851.

Meldrum, Perkin, *J. Chem. Soc.*, 1908, **93**, 1420.

Borsche, Böcker, *Ber.*, 1903, **36**, 4359.

3-Hydroxy-*p*-toluic Acid (*m*-Cresotic acid, *m*-cresotinic acid, α -*m*-homosalicylic acid, 2-hydroxy-4-methylbenzoic acid, 4-methylsalicylic acid, *m*-cresol-4-carboxylic acid).

Needles from H_2O , plates from $CHCl_3$. M.p. 177° (173°). Sol. EtOH, $CHCl_3$. Mod. sol. H_2O . $k = 6.84 \times 10^{-4}$ at 25°. Sublimes. $FeCl_3 \rightarrow$ violet col.

Me ester: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. 27–8°. B.p. 236–7°, 242–4°/760 mm. D_4^{20} 1.1621, $D_4^{15.2}$ 1.1483. $n_D^{15.2}$ 1.5378.

Et ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 254°, 133°/11 mm. D_4^{23} 1.0950. Alc. $FeCl_3 \rightarrow$ intense violet col.

Phenyl ester: $C_{14}H_{12}O_3$. MW, 228. Needles from EtOH. M.p. 49°.

p-Nitrobenzyl ester: $C_{15}H_{13}O_5N$. MW, 287. Cryst. from EtOH.Aq. M.p. 174–5–175°.

Phenacyl ester: $C_{16}H_{14}O_4$. MW, 270. Cryst. from EtOH.Aq. M.p. 116–5°.

Acetyl: needles from H_2O or C_6H_6 . M.p. 139° (125–6°). Sol. EtOH, C_6H_6 , AcOH. Spar. sol. cold H_2O .

Chloride: $C_8H_7O_2Cl$. MW, 170.5. *Acetyl*: cryst. M.p. 15°. B.p. 141°/10 mm.

Me ether: plates from H_2O . M.p. 74° (69°).

Me ester: $C_{10}H_{12}O_3$. MW, 180. Oil. B.p. 259–61°. D_4^{20} 1.1462.

Et ether: cryst. M.p. 78–5°.

Tiemann, Schotten, *Ber.*, 1878, **11**, 777.

Eijkmann, *Chem. Zentr.*, 1904, **I**, 1597.

Anschütz, *Ann.*, 1909, **367**, 219.

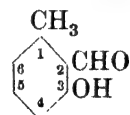
Béhal, Tiffeneau, *Bull. soc. chim.*, 1908, **3**, 730.

Pinner, *Ber.*, 1890, **23**, 2938.

Lyons, Reid, *J. Am. Chem. Soc.*, 1917, **39**, 1737.

Rather, Reid, *J. Am. Chem. Soc.*, 1919, **41**, 83.

3-Hydroxy-*o*-toluic Aldehyde (6-Hydroxy-2-methylbenzaldehyde, β -*m*-homosalicylaldehyde, *m*-cresol-2-aldehyde, 6-methylsalicylaldehyde)



$C_8H_8O_2$ MW, 136

Needles from H_2O . M.p. 31.4–31.9°. B.p. 228–9.3°/728 mm. Sol. C_6H_6 . Spar. sol. pet. ether. Volatile in steam. $FeCl_3 \rightarrow$ violet col. Forms bisulphite comp.

Oxime: needles from H_2O . M.p. 118.5–119.5°. Sol. EtOH.

Semicarbazone: plates from EtOH. M.p. 212–14° decomp.

Phenylhydrazone: cryst. M.p. 172°.

Me ether: $C_9H_{10}O_2$. MW, 150. Needles. M.p. 41.5–42°. Sol. hot pet. ether. Forms bisulphite comp.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 139.

Anselmino, *Ber.*, 1917, **50**, 395.

5-Hydroxy-*o*-toluic Aldehyde (4-Hydroxy-2-methylbenzaldehyde, *m*-cresol-6-aldehyde).

Plates from H_2O . M.p. 110°. Sol. EtOH, Et₂O. Mod. sol. $CHCl_3$. Sol. alkalis. $FeCl_3 \rightarrow$ yellowish-red col. Non-volatile in steam. Stable to most oxidising agents. KOH fusion \rightarrow 5-hydroxy-*o*-toluic acid.

Me ether: 2-methylanisaldehyde. Cryst. from MeOH. B.p. 257°. *Oxime*: needles from ligroin. M.p. 81°.

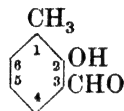
Et ether: $C_{10}H_{12}O_2$. MW, 164. B.p. 260–2°. *Oxime*: cryst. from $CHCl_3$ -ligroin. M.p. 84°.

Gattermann, Berchemann, *Ber.*, 1898, 31, 1767.

Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).

Gattermann, *Ann.*, 1907, 357, 358.

2-Hydroxy-*m*-toluic Aldehyde (2-Hydroxy-3-methylbenzaldehyde, *o*-homosalicylaldehyde, *o*-cresol-3-aldehyde, 3-methylsalicylaldehyde)



$C_9H_8O_2$

MW, 136

Cryst. M.p. 17°. B.p. 208–9°. Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. H_2O . Volatile in steam. $FeCl_3 \rightarrow$ blue col.

Acetyl: b.p. 267°. Forms bisulphite comp.

Oxime: needles from H_2O . M.p. 99°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Insol. cold H_2O , ligroin.

Phenylhydrazone: plates from ligroin. M.p. 97°.

p-Bromophenylhydrazone: plates from ligroin. M.p. 108°.

Semicarbazone: needles from AcOH. M.p. 248° (241°) decomp.

Azine: yellow needles from AcOH. M.p. 229°. Spar. sol. AcOH.

Me ether: $C_9H_{10}O_2$. MW, 150. Oil. B.p. about 120°/6 mm. Conc. $H_2SO_4 \rightarrow$ red col.

Oxime: needles from MeOH. M.p. 118°.

Semicarbazone: needles from EtOH. M.p. 224°.

Tiemann, Schotten, *Ber.*, 1878, 11, 772.

Paschen, *Ber.*, 1891, 24, 3668.

Anselmino, *Ber.*, 1902, 35, 4104.

Simonsen, *J. Chem. Soc.*, 1918, 113, 777.

Bell, Henry, *J. Chem. Soc.*, 1928, 2222.

4-Hydroxy-*m*-toluic Aldehyde (6-Hydroxy-3-methylbenzaldehyde, *p*-homosalicylaldehyde, *p*-cresol-3-aldehyde, 5-methylsalicylaldehyde).

Plates from EtOH.Aq. M.p. 56°. B.p. 217–18°. Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. H_2O . D_4^{20} 1.0913. n_D^{20} 1.547. Volatile in steam. $FeCl_3 \rightarrow$ deep blue col.

Acetyl: needles from EtOH.Aq. M.p. 57°. Non-volatile in steam. Forms spar. sol. bisulphite comp. *Azine*: cryst. from EtOH. M.p. 163°.

Oxime: needles from H_2O . M.p. 105°.

Phenylhydrazone: yellow needles from EtOH. M.p. 149°. *Acetyl*: needles from ligroin. M.p.

Dict. of Org. Comp.—II.

126°. *Benzoyl*: yellow prisms from EtOH. M.p. 161°.

p-Bromophenylhydrazone: yellow plates from EtOH. Decomp. at 181°.

Semicarbazone: needles from AcOH. Decomp. at 238°.

Hydrazone: powder. M.p. 72–4°.

Me ether: b.p. 250°, 130.2°/12 mm. D_4^{20} 1.0988. n_D^{20} 1.554. *Oxime*: needles from H_2O . M.p. 144–5°.

Et ether: $C_{10}H_{12}O_2$. MW, 164. Needles from ligroin. M.p. 32–3°. B.p. 257°. *Oxime*: needles from ligroin. M.p. 87°. *Azine*: yellow prisms from EtOH- $CHCl_3$. M.p. 154–5°.

Tiemann, Schotten, *Ber.*, 1878, 11, 773.

Schotten, *ibid.*, 785.

Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).

Goldbeck, *Ber.*, 1891, 24, 3658.

Auwers, *Ann.*, 1915, 408, 241.

Adams, *J. Am. Chem. Soc.*, 1919, 41, 268.

A.G.F.A., E.P., 145,581, (*Chem. Abstracts*, 1920, 14, 3427).

See also fourth reference above.

6-Hydroxy-*m*-toluic Aldehyde (4-Hydroxy-3-methylbenzaldehyde, *o*-cresol-5-aldehyde).

Prisms from H_2O . M.p. 118° (115°). Sol. hot H_2O , EtOH, Et_2O . Mod. sol. $CHCl_3$. Sol. alkalis. Non-volatile in steam. $FeCl_3 \rightarrow$ bluish-violet col.

Acetyl: needles from EtOH.Aq. M.p. 39–40°. B.p. about 275°. Forms bisulphite comp.

Oxime: needles from H_2O . M.p. 143.5°.

Semicarbazone: needles from AcOH. M.p. 216°.

Me ether: 3-methylanisaldehyde. Oil. B.p. 251°. *Oxime*: cryst. from C_6H_6 -ligroin. M.p. 68–70°.

Et ether: needles from ligroin. M.p. 33–4°. B.p. 258–60°. *Oxime*: needles from EtOH.Aq.

M.p. 92–3°.

Paschen, *Ber.*, 1891, 24, 3672.

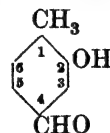
Gattermann, Berchemann, *Ber.*, 1898, 31, 1766.

Gattermann, Frenzel, *Ber.*, 1898, 31, 1150.

Gattermann, *Ann.*, 1907, 357, 355.

Bell, Henry, *J. Chem. Soc.*, 1928, 2222.

2-Hydroxy-*p*-toluic Aldehyde (3-Hydroxy-4-methylbenzaldehyde, *o*-cresol-4-aldehyde)



$C_9H_8O_2$

MW, 136

22

3-Hydroxy-p-toluic Aldehyde

Yellow needles from H_2O . M.p. 73° .

Sidgwick, Allott, *J. Chem. Soc.*, 1923, 123, 2820.

3-Hydroxy-p-toluic Aldehyde (2-Hydroxy-4-methylbenzaldehyde, α -m-homosalicylaldehyde, m-cresol-4-aldehyde, 4-methylsalicylaldehyde).

Needles from EtOH or H_2O . M.p. $60-1^\circ$. B.p. $219-21^\circ/726$ mm. Sol. most org. solvents. Spar. sol. H_2O , cold EtOH. Volatile in steam. $\text{FeCl}_3 \rightarrow$ violet col.

Oxime: plates from EtOH.Aq. M.p. $108-5-109^\circ$. Sol. EtOH, C_6H_6 . Insol. pet. ether.

Semicarbazone: cryst. M.p. 268° .

Phenylhydrazone: cryst. M.p. 161° .

Me ether: $\text{C}_9\text{H}_{10}\text{O}_2$. MW, 150. Needles. M.p. $42-3^\circ$. B.p. $263-4^\circ/720$ mm. Sol. EtOH, C_6H_6 . Spar. sol. hot H_2O . Volatile in steam. No col. with FeCl_3 . Forms bisulphite comp.

Tiemann, Schotten, *Ber.*, 1878, 11, 773.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, 35, 134.

Fries, Klostermann, *Ber.*, 1906, 39, 872.

Anselmino, *Ber.*, 1917, 50, 395.

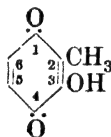
ω -Hydroxy-p-toluic Aldehyde.

See p-Hydroxymethylbenzaldehyde.

Hydroxytoluquinaldine.

See 4-Hydroxy-2:6-dimethylquinoline and 4-Hydroxy-2:8-dimethylquinoline.

3-Hydroxytoluquinone (3-Hydroxy-2-methyl-p-benzoquinone)



$\text{C}_7\text{H}_6\text{O}_3$

MW, 138

Me ether: $\text{C}_8\text{H}_8\text{O}_3$. MW, 152. Oil. Slowly solidifies. $\text{H}_2\text{S.Aq.} \rightarrow$ 3:6-dihydroxy-2-methoxytoluene.

Majima, Okazaki, *Ber.*, 1916, 49, 1490.

5-Hydroxytoluquinone (5-Hydroxy-2-methyl-p-benzoquinone).

Yellow needles from C_6H_6 . M.p. 142° decomp. Sol. H_2O . Reacts acid. Red sols in alkalis.

Acetyl: yellow prisms from ligroin. M.p. $75-6^\circ$.

Me ether: needles from EtOH. M.p. $170-2^\circ$ decomp. Sol. hot H_2O , EtOH, C_6H_6 . Spar. sol. Et_2O , pet. ether. Volatile in steam. $\text{H}_2\text{S} \rightarrow$ 2:5-dihydroxy-4-methoxytoluene.

Et ether: $\text{C}_9\text{H}_{10}\text{O}_3$. MW, 166. Yellow cryst.

338

2-Hydroxy-3:4:6-triethoxybenzoyl-formic Acid

from pet. ether. M.p. 101° . Sol. EtOH, C_6H_6 , ligroin. Readily sublimes.

Thiele, Winter, *Ann.*, 1900, 311, 350.

Jacobson, Jankowski, *Ann.*, 1909, 369, 20.

Luff, Perkin, Robinson, *J. Chem. Soc.*, 1910, 97, 1137.

6-Hydroxytoluquinone (6-Hydroxy-2-methyl-p-benzoquinone).

Me ether: cryst. M.p. 147° .

Henrich, Nachtigall, *Ber.*, 1903, 36, 894.

Hydroxytolylenediamine.

See Diaminocresol.

Hydroxytoxicarol

$\text{C}_{23}\text{H}_{24}\text{O}_8$

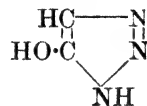
MW, 428

Yellow prisms. M.p. $226-7^\circ$. $\text{FeCl}_3 \rightarrow$ deep green col. 5% Alc. HCl \rightarrow dehydrotoxicarol.

Acetyl: plates from AcOH. M.p. 184° .

Clark, *J. Am. Chem. Soc.*, 1934, 56, 987.

5-Hydroxy-1:2:3-triazole



$\text{C}_2\text{H}_3\text{ON}_3$

MW, 85

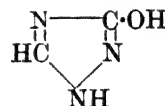
Needles. M.p. 130° . Very sol. EtOH, H_2O . Sol. AcOH. Spar. sol. Et_2O . Insol. ligroin, C_6H_6 . Acid to litmus.

Dibenzoyl deriv.: needles from EtOH. M.p. 104° .

Dimroth, *Ann.*, 1910, 373, 352.

Curtius, Boekmuhl, *Ber.*, 1910, 33, 2444.

3-Hydroxy-1:2:4-triazole



$\text{C}_2\text{H}_3\text{ON}_3$

MW, 85

Cryst. from EtOH. M.p. 234° . Very sol. H_2O , EtOH, HCl. Insol. Et_2O . Acid to litmus.

O:N-Diacetyl: plates from EtOH. M.p. 137° . Very sol. H_2O , EtOH.

Widman, Cleve, *Ber.*, 1898, 31, 379.

Monchat, Noll, *Ann.*, 1905, 343, 25.

Hydroxytricarballic Acid.

See Citric Acid and Isocitric Acid.

2-Hydroxy-3:4:6-triethoxybenzoyl-formic Acid.

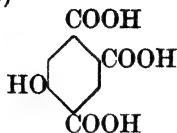
See Gossypetonic Acid.

2-Hydroxytriethylamine

2-Hydroxytriethylamine.

See 2-Diethylaminoethyl Alcohol.

5-Hydroxytrimellitic Acid (*Phenol-2:4:5-tricarboxylic acid*)



$C_9H_6O_7$

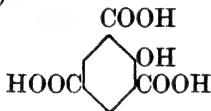
MW, 226

Prisms + $2H_2O$ from H_2O . M.p. anhyd. $240-5^\circ$ decomp. Sol. EtOH. Spar. sol. H_2O . KOH fusion \rightarrow phenol. HCl at $230-40^\circ \rightarrow$ *m*-hydroxybenzoic acid. $FeCl_3 \rightarrow$ brownish-red col.

Kögl, Erxleben, Jänecke, *Ann.*, 1930, **482**, 117.

Jacobsen, *Ber.*, 1883, **16**, 192.

Hydroxytrimesic Acid (*Phenol-2:4:6-tricarboxylic acid*)



$C_9H_6O_7$

MW, 226

Prisms + $1H_2O$ from H_2O . Spar. sol. Et_2O . Insol. $CHCl_3$, C_6H_6 , ligroin. $FeCl_3 \rightarrow$ reddish-brown col. Heat \rightarrow salicylic acid + 4-hydroxyisophthalic acid + phenol.

Tri-Et ester: $C_{15}H_{18}O_7$. MW, 310. Prisms from EtOH. M.p. 83° . Sol. Et_2O , C_6H_6 , hot H_2O .

Me ether: anisole-2:4:6-tricarboxylic acid. $C_{10}H_8O_7$. MW, 240. Needles from AcOH. M.p. 248° . Sol. EtOH, Et_2O , AcOH, hot H_2O . Insol. C_6H_6 . *Tri-Me ester*: $C_{13}H_{14}O_7$. MW, 282. Needles from pet. ether. M.p. 86° . Sol. EtOH, Et_2O , C_6H_6 .

Ost, *J. prakt. Chem.*, 1877, **15**, 302.

Errera, *Ber.*, 1898, **31**, 1684.

Ullmann, Brittner, *Ber.*, 1909, **42**, 2543.

1-Hydroxy-3:4:5-trimethoxybenzene.

See Antiarol.

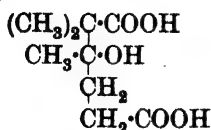
Hydroxytrimethylacetaldehyde.

See Hydroxypivalic Aldehyde.

Hydroxytrimethylacetic Acid.

See Hydroxypivalic Acid.

2-Hydroxy-1:1:2-trimethyladipic Acid



$C_9H_{16}O_5$

MW, 204

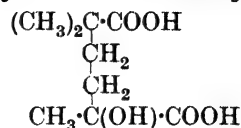
339 6-Hydroxy-3:3':4'-trimethylazobenzene

Exists only in solution. Warm $H_2SO_4 \rightarrow$ levulinic and isobutyric acids.

Lactone: $C_9H_{14}O_4$. MW, 186. Prisms from Et_2O . M.p. $108-9^\circ$. *Et ester*: $C_{11}H_{18}O_4$. MW, 214. B.p. $165-8^\circ/18$ mm.

Harding, *J. Chem. Soc.*, 1912, **101**, 1593.

4-Hydroxy-1:1:4-trimethyladipic Acid



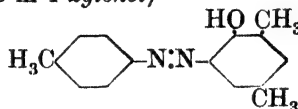
$C_9H_{16}O_5$

MW, 204

Cryst. from H_2O . M.p. $145-8^\circ$. Sol. H_2O . Insol. C_6H_6 . HI \rightarrow 1:1:4-trimethyladipic acid.

Auwers, Hessenland, *Ber.*, 1908, **41**, 1813.

2-Hydroxy-3:5:4'-trimethylazobenzene (Tolueneazo-m-4-xyleneol)



$C_{15}H_{16}ON_2$

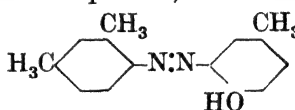
MW, 240

Red needles from EtOH. M.p. 99° . Sol. dil. alkalis. Spar. sol. pet. ether.

Et ether: $C_{17}H_{20}ON_2$. MW, 268. Red prisms from pet. ether. M.p. $51-2^\circ$. Sol. EtOH, C_6H_6 , pet. ether.

Jacobsen, *Ann.*, 1909, **369**, 24.

6-Hydroxy-3:2':4'-trimethylazobenzene (m-Xyleneazo-p-cresol)



$C_{15}H_{16}ON_2$

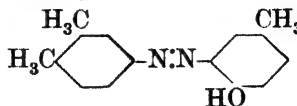
MW, 240

Reddish-brown needles from EtOH.Aq. M.p. 85° . B.p. $230-33^\circ/30$ mm.

Et ether: red plates from ligroin. M.p. 51° . B.p. $238-42^\circ/25$ mm. Sol. EtOH, C_6H_6 .

Jacobsen, *Ann.*, 1909, **369**, 31.

6-Hydroxy-3:3':4'-trimethylazobenzene (o-Xyleneazo-p-cresol)



$C_{15}H_{16}ON_2$

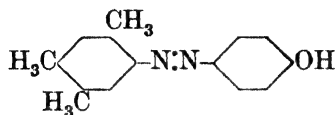
MW, 240

Brown cryst. from AcOH.Aq. M.p. $131-2^\circ$. Sol. Et_2O , AcOH. Spar. sol. MeOH, ligroin.

Acetyl: orange-yellow leaflets from AcOH.Aq. M.p. 106°.

Auwers, *Ann.*, 1909, 365, 292, 304.

4-Hydroxy-2':4':5'-trimethylazobenzene (*ψ-Cumeneazophenol*)



$C_{15}H_{16}ON_2$ MW, 240

Yellow leaflets pptd. from NH_4OH by CO_2 . M.p. 94°. Sol. EtOH, C_6H_6 . Spar. sol. ligroin. *B.HCl*: m.p. 162°.

Acetyl: orange needles from EtOH. M.p. 105°.

Me ether: *ψ*-cumeneazoanisole. $C_{16}H_{18}ON_2$. MW, 254. Brown needles. M.p. 89°.

Goldschmidt, Brubacher, *Ber.*, 1891, 24, 2312.

Farmer, Hantzsch, *Ber.*, 1899, 32, 3097.

Hydroxytrimethylbenzaldehyde.

See Trimethylsalicylaldehyde.

6-Hydroxy-2:3:5-trimethylbenzyl Alcohol.

See 3:5:6-Trimethylsaligenin.

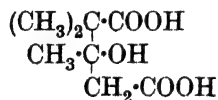
2-Hydroxy-1:1:2-trimethylbutyric Acid.

See 2-Hydroxy-1:1-dimethylisovaleric Acid.

2-Hydroxy-1:1:4-trimethylcaproic Acid.

See 2-Hydroxy-1:1-dimethylisoamylacetic Acid.

2-Hydroxy-1:1:2-trimethylglutaric Acid



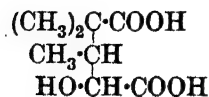
$C_8H_{14}O_5$ MW, 190

Prisms from pet. ether. M.p. 128°. Sol. H_2O , org. solvents.

Di-Et ester: $C_{12}H_{22}O_5$. MW, 246. B.p. 160–70°/30 mm.

Perkin, Thorpe, *J. Chem. Soc.*, 1897, 71, 1179.

3-Hydroxy-1:1:2-trimethylglutaric Acid

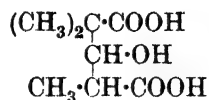


$C_8H_{14}O_5$ MW, 190

Lactone: $C_8H_{12}O_4$. MW, 172. Needles from toluene. M.p. 110°. Alk. $KMnO_4 \rightarrow$ trimethylsuccinic acid.

Bardhan, *J. Chem. Soc.*, 1928, 2620.

2-Hydroxy-1:1:3-trimethylglutaric Acid



$C_8H_{14}O_5$ MW, 190

Cis:

Cryst. from toluene. M.p. 115°. Sol. H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 , $CHCl_3$.

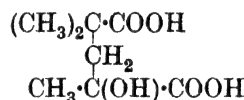
Trans:

Cryst. from warm Et_2O . M.p. 156–7°. Sol. H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 , $CHCl_3$, toluene.

Perkin, Smith, *J. Chem. Soc.*, 1903, 83, 775.

Cahn, Gibson, Penfold, Simonsen, *J. Chem. Soc.*, 1931, 293.

3-Hydroxy-1:1:3-trimethylglutaric Acid

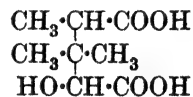


$C_8H_{14}O_5$ MW, 190

Di-nitrile: $C_8H_{12}ON_2$. MW, 152. Needles from AcOEt-pet. ether. M.p. 165–6°. Sol. H_2O , $CHCl_3$. Spar. sol. pet. ether.

Lapworth, *J. Chem. Soc.*, 1904, 85, 1223.

3-Hydroxy-1:2:2-trimethylglutaric Acid



$C_8H_{14}O_5$ MW, 190

Lactone: $C_8H_{12}O_4$. MW, 172. Prisms from H_2O . M.p. 165–6°. Sol. H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 , pet. ether.

Balbiano, *Ber.*, 1894, 27, 2136.

Chandrasena, Ingold, Thorpe, *J. Chem. Soc.*, 1922, 121, 1550.

3-Hydroxy-2:4:4-trimethylhexane.

See Isopropyl-*tert*.-amylcarbinol.

1-Hydroxy-2:2:2-trimethylpropionic Acid.

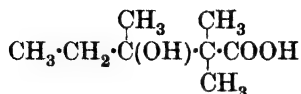
See 1-Hydroxy-2:2-dimethylbutyric Acid.

Hydroxytrimethylsuccinic Acid.

See Trimethylmalic Acid.

2-Hydroxy-1 : 1 : 2-trimethyl-*n*-valeric Acid 341

2-Hydroxy-1 : 1 : 2-trimethyl-*n*-valeric Acid (1 : 1 : 2-Trimethyl-2-ethylhydracrylic acid)

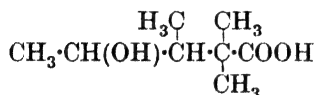


$\text{C}_8\text{H}_{16}\text{O}_3$ MW, 160

Et ester : $\text{C}_{10}\text{H}_{20}\text{O}_3$ MW, 188. B.p. 92°/11 mm.

Bardhan, *J. Chem. Soc.*, 1928, 2615.

3-Hydroxy-1 : 1 : 2-trimethyl-*n*-valeric Acid



$\text{C}_8\text{H}_{16}\text{O}_3$ MW, 160

Lactone : $\text{C}_8\text{H}_{14}\text{O}_2$. MW, 142. B.p. 121–3°/33 mm.

Jacobs, Scott, *J. Biol. Chem.*, 1931, 93, 145.

2-Hydroxy-1 : 1 : 3-trimethyl-*n*-valeric Acid.

See 2-Hydroxy-1 : 1-dimethylisocaproic Acid.

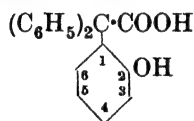
2-Hydroxy-1 : 2 : 3-trimethyl-*n*-valeric Acid.

See 2-Hydroxy-1 : 2-dimethylisocaproic Acid.

1-Hydroxy-1 : 3 : 3-trimethyl-*n*-valeric Acid.

See 1-Hydroxy-1 : 3-dimethylisocaproic Acid.

2-Hydroxytriphenylacetic Acid (2-Hydroxytriphenylmethane- α -carboxylic acid)



$\text{C}_{20}\text{H}_{16}\text{O}_3$ MW, 304

Cryst. from Et_2O . M.p. 149–50°. Slowly changes to lactone.

Me ether : $\text{C}_{21}\text{H}_{17}\text{O}_3$. MW, 318. Cryst. from EtOH. M.p. 234–5°. Sol. Me_2CO , AcOH, C_6H_6 . Spar. sol. EtOH. Loses CO_2 at 300° → 2-methoxytriphenylmethane. Conc. H_2SO_4 → 2-methoxytriphenylcarbinol. *Me ester* : $\text{C}_{22}\text{H}_{19}\text{O}_3$. MW, 332. Prisms from EtOH. M.p. 134°. Sol. conc. H_2SO_4 to violet sol.

Et ether : $\text{C}_{22}\text{H}_{19}\text{O}_3$. MW, 332. Needles from AcOH. M.p. 264°. Sol. hot AcOH. Spar. sol. EtOH, Et_2O , Me_2CO , C_6H_6 . Sol. conc. H_2SO_4 to red sol. *Et ester* : $\text{C}_{24}\text{H}_{23}\text{O}_3$. MW, 360. Cryst. from EtOH. M.p. 84°. Sol. EtOH, Me_2CO , AcOH, C_6H_6 . Sol. conc. H_2SO_4 to violet sol.

4-Hydroxytriphenylcarbinol

Lactone : $\text{C}_{20}\text{H}_{14}\text{O}_2$. MW, 286. Leaflets from Et_2O –EtOH. M.p. 120°. Sol. Et_2O , Me_2CO , AcOEt, C_6H_6 . Spar. sol. EtOH.

Liebig, Keim, *Ann.*, 1908, 360, 207.

4-Hydroxytriphenylacetic Acid (4-Hydroxytriphenylmethane- α -carboxylic acid).

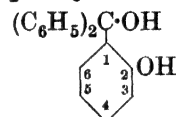
Needles from EtOH.Aq. M.p. 212° decomp. Sol. MeOH, EtOH, Et_2O , Me_2CO , AcOH, C_6H_6 . Spar. sol. CHCl_3 . Insol. ligroin. Sol. conc. H_2SO_4 to yellow sol.

Me ether : needles from 50% AcOH. M.p. 174°. *Me ester* : prisms from AcOH. M.p. 138–9°. Sol. EtOH.

Mixed anhydride with CH_3COOH : $\text{C}_{24}\text{H}_{20}\text{O}_5$. MW, 388. Needles from AcOH. M.p. 208° decomp.

Bistrzycki, Nowakowska, *Ber.*, 1901, 34, 3063.

2-Hydroxytriphenylcarbinol



$\text{C}_{19}\text{H}_{16}\text{O}_2$ MW, 276

Prisms from Et_2O –ligroin. M.p. 140·5° (142°). Very sol. EtOH, Et_2O , CHCl_3 , C_6H_6 . Insol. ligroin.

Me ether : $\text{C}_{20}\text{H}_{18}\text{O}_2$. MW, 290. Leaflets from EtOH. M.p. 134° (128–9°).

Phenyl ether : $\text{C}_{25}\text{H}_{20}\text{O}_2$. MW, 352. Needles from ligroin. M.p. 120°. Very sol. Et_2O , C_6H_6 . Sol. boiling ligroin.

Baeyer, *Ann.*, 1907, 354, 167.

Liebig, *Ann.*, 1908, 360, 213.

Ullmann, Engi, *Ber.*, 1904, 37, 2368.

Kauffmann, Pannwitz, *Ber.*, 1912, 45, 769.

3-Hydroxytriphenylcarbinol.

Plates from C_6H_6 –ligroin. M.p. 147–8°.

Me ether : cryst. from Et_2O . M.p. 88°.

Baeyer, *Ann.*, 1907, 354, 170.

Kauffmann, Pannwitz, *Ber.*, 1912, 45, 770.

4-Hydroxytriphenylcarbinol.

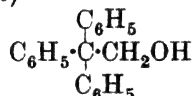
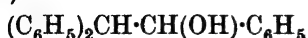
Exists in two forms.

(i) *High melting (benzenoid) form.*

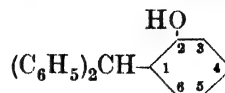
Needles from EtOH (containing trace of NH_3). M.p. 157–9° after turning yellow at 110–20°. Sol. 150 parts C_6H_6 at ord. temp. Converted to low melting form by cryst. from solvents containing a trace of acid.

2-Hydroxy-1 : 1 : 1-triphenylethane

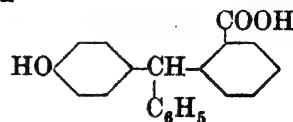
342

(ii) *Low melting (quinonoid) form.*Yellow cryst. from 40–50% AcOH. M.p. 139–40°. Sol. 150 parts C₆H₆ at ord. temp.*Me ether*: C₂₀H₁₈O₂. MW, 290. Exists in two forms. (i) M.p. 84°. (ii) M.p. 61°.*Di-Me ether*: C₂₁H₂₀O₂. MW, 304. Cryst. M.p. 74°.*Di-Et ether*: C₂₃H₂₄O₂. MW, 332. Plates from EtOH.Aq. M.p. 87°.*Acetyl*: plates from AcOH. M.p. 136°.Gomberg, Jickling, *J. Am. Chem. Soc.*, 1915, **37**, 2589.Gomberg, *J. Am. Chem. Soc.*, 1913, **35**, 209.Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 771.Baeyer, Villiger, *Ber.*, 1902, **35**, 3027.**2-Hydroxy-1 : 1 : 1-triphenylethane**
(2 : 2 : 2-Triphenylethyl alcohol, α -hydroxymethyl-triphenylmethane)C₂₀H₁₈O MW, 274Cryst. from EtOH. M.p. 110.5° (107°). Sol. Et₂O, ligroin.*Acetyl*: needles from EtOH. M.p. 136°.*Phenylurethane*: cryst. M.p. 205–6°.Danilow, *J. Russ. Phys.-Chem. Soc.*, 1920, **51**, 122.Schlenk, Ochs, *Ber.*, 1916, **49**, 610.**1-Hydroxy-1 : 1 : 2-triphenylethane** (*Di-phenylbenzylcarbinol*, 1 : 1 : 2-triphenylethyl alcohol)C₂₀H₁₈O MW, 274Needles from C₆H₆-pet. ether. M.p. 89–90° (88°). B.p. 222°/11 mm. Sol. EtOH, AcOH. Spar. sol. Et₂O, ligroin.Hell, Wiegandt, *Ber.*, 1904, **37**, 1429.Paternò, Chieffi, *Gazz. chim. ital.*, 1909, **39**, 422.**2-Hydroxy-1 : 1 : 2-triphenylethane**
(*Phenylbenzylhydricarbinol*, 1 : 2 : 2-triphenylethyl alcohol)C₂₀O₁₈O MW, 274

Needles from AcOH. M.p. 87°.

Gardeur, *Chem. Zentr.*, 1897, II, 661.**Hydroxytriphenylethylene.***See* Diphenylbenzoylmethane.**4'-Hydroxytriphenylmethane-2-carboxylic Acid** α -Hydroxytriphenylmethane.*See* Triphenylcarbinol.**2-Hydroxytriphenylmethane** (*o-Benz-hydrylphenol*)C₁₉H₁₆O MW, 260Needles from C₆H₆-ligroin or EtOH. M.p. 76° (with EtOH of cryst.), 124° (EtOH free). Green sol. in conc. H₂SO₄.*Me ether*: C₂₀H₁₈O. MW, 274. Cryst. from EtOH. M.p. 114° (116°). Very sol. Et₂O, C₆H₆, AcOH. Green sol. in conc. H₂SO₄.*Et ether*: C₂₁H₂₀O. MW, 288. Prisms from EtOH. M.p. 63.5–64° (68°). Sol. EtOH, Et₂O, warm ligroin.*Acetyl*: plates from EtOH. M.p. 81–2°.Baeyer, *Ann.*, 1907, **354**, 169.Liebig, Keim, *Ann.*, 1908, **360**, 216.Salomon, *Chem. Zentr.*, 1899, I, 172.Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 774.**3-Hydroxytriphenylmethane** (*m-Benz-hydrylphenol*).

Prisms from ligroin. M.p. 106°.

Me ether: plates from EtOH. M.p. 86°. Very sol. Et₂O, CHCl₃, C₆H₆. Sol. EtOH, AcOH. Yellow sol. in conc. H₂SO₄.Baeyer, *Ann.*, 1907, **354**, 171.Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 770.**4-Hydroxytriphenylmethane** (*p-Benz-hydrylphenol*).Needles from EtOH.Aq. M.p. 110° (118°). Very sol. Et₂O, EtOH. Spar. sol. ligroin, 50% AcOH.*Me ether*: prisms from CHCl₃-MeOH. M.p. 61° (64–5°).*Et ether*: prisms from AcOH.Aq. M.p. 70–1°. Sol. most org. solvents.*Acetyl*: needles from AcOH.Aq. M.p. 84°. Very sol. most org. solvents.Bistrzycki, Herbst, *Ber.*, 1902, **35**, 3137.Baeyer, Villiger, *Ber.*, 1903, **36**, 2790.Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 771.**Hydroxytriphenylmethane- α -carboxylic Acid.***See* Hydroxytriphenylacetic Acid.**4'-Hydroxytriphenylmethane-2-carboxylic Acid**C₂₀H₁₆O₃

MW, 304

α -Hydroxytriphenylmethane-carboxylic Acid 343

Needles from EtOH.Aq. M.p. 210–11°. Sol. EtOH, Me₂CO, AcOH, C₆H₆. Violet sols in alkalis.

Acetyl: needles from AcOH.Aq. M.p. 148°. Sol. Me₂CO. Spar. sol. EtOH, AcOH, C₆H₆.

Orndorff, Barrett, *J. Am. Chem. Soc.*, 1924, **46**, 2495.

v. Pechmann, *Ber.*, 1880, **13**, 1616.

α -Hydroxytriphenylmethane-carboxylic Acid.

See Triphenylcarbinol-carboxylic Acid.

4-Hydroxy-2 : 3 : 4-triphenyl-*n*-valeric Acid.

See Amaric Acid.

3-Hydroxyundecane.

See Ethyloctylcarbinol.

1-Hydroxyundecylic Acid (1-Hydroxy-undecanoic acid)



C₁₁H₂₂O₃ MW, 202

Needles from pet. ether or CHCl₃. M.p. 69°. Sol. EtOH, Et₂O. Spar. sol. cold H₂O.

Et ester: C₁₃H₂₆O₃. MW, 230. Cryst. from CHCl₃. M.p. 38°.

Anilide: cryst. from AcOEt-pet. ether. M.p. 80°.

Bagard, *Bull. soc. chim.*, 1907, **1**, 310, 354.

3-Hydroxyundecylic Acid (3-Hydroxyundecanoic acid)



C₁₁H₂₂O₃ MW, 202

M.p. 34°. Readily forms lactone.

Lactone: C₁₁H₂₀O₂. MW, 184. B.p. 286°.

Shukow, Schestakow, *Chem. Zentr.*, 1908, **II**, 1415.

10-Hydroxyundecylic Acid (10-Hydroxyundecanoic acid, ω -hydroxyundecylic acid)



C₁₁H₂₂O₃ MW, 202

Needles from H₂O. M.p. 76°. Sol. EtOH. Et₂O. Spar. sol. ligroin, C₆H₆.

Me ester: C₁₃H₂₄O₃. MW, 216. M.p. 27–27.5°. B.p. 168–9/8 mm. Sol. EtOH, Et₂O, C₆H₆.

Nitrile: C₁₁H₂₁ON. MW, 183. M.p. 12–13°. B.p. 186–7°/13 mm. D₂₀ 0.910.

Acetyl: m.p. 34°. B.p. 184–5°/2 mm.

Cohen, *J. Chem. Soc.*, 1932, 596.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, **12**, 476.

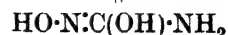
See also Lycan, Adams, *J. Am. Chem. Soc.*, 1929, **51**, 628.

2-Hydroxy-*n*-valeric Acid

5-Hydroxyuracil.

See Isobarbituric Acid.

Hydroxyurea (Carbamylhydroxylamine)



MW, 76

Needles from EtOH. M.p. 139–40° (128–30°). Sol. H₂O. Spar. sol. cold EtOH. Reduces Fehling's and warm NH₃.AgNO₃. FeCl₃ → intense bluish-violet col.

Dresler, Stein, *Ann.*, 1869, **150**, 242.

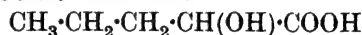
Hantzsch, *Ann.*, 1898, **299**, 99.

Francesconi, Partozani, *Gazz. chim. ital.*, 1901, **31**, 334.

Hydroxyuvitic Acid.

See Hydroxy-5-methylisophthalic Acid.

1-Hydroxy-*n*-valeric Acid (Valerolactinic acid, propylglycollic acid)



C₅H₁₀O₃ MW, 118

Hygroscopic plates. M.p. 28–9° (34°). Sublimes. Sol. H₂O, EtOH.

Et ester: C₇H₁₄O₃. MW, 146. B.p. 190°. Sol. EtOH, Et₂O. Spar. sol. H₂O.

Nitrile: butyraldehyde cyanhydrin. C₅H₉ON. MW, 99. B.p. 111°/20 mm. D₁₅ 0.9434. n_D¹⁵ 1.4228. Sol. EtOH, Et₂O. Insol. H₂O. *Acetyl*: b.p. 194°. D₂₄ 0.9696. Sol. EtOH, Et₂O. Insol. H₂O.

Et ether: C₇H₁₄O₃. MW, 146. B.p. 124°/17 mm., 114°/11 mm. *Me ester*: C₈H₁₆O₃. MW, 160. B.p. 70°/15 mm. *Et ester*: C₉H₁₈O₃. MW, 174. B.p. 84°/17 mm., 76°/12 mm. *Chloride*: C₇H₁₃O₂Cl. MW, 164.5. B.p. 57–58°/12 mm. *Amide*: C₇H₁₅O₂N. MW, 145. M.p. 91°.

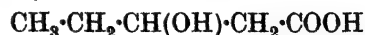
Fittig, Dannenberg, *Ann.*, 1904, **331**, 132. Levene, Haller, *J. Biol. Chem.*, 1928, **77**, 555.

Blaise, Picard, *Bull. soc. chim.*, 1912, **11**, 544.

Juslin, *Ber.*, 1884, **17**, 2504.

Henry, *Chem. Zentr.*, 1899, **I**, 194.

2-Hydroxy-*n*-valeric Acid (2-Ethylhydroacrylic acid)



C₅H₁₀O₃ MW, 118

Not solid at –32°. [α]_D²⁰ –10.0°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Insol. CS₂, ligroin. Dist. → 1 : 2- and 2 : 3-pentenic acids.

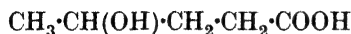
Et ester: b.p. 75–7°/9 mm. $[\alpha]_D^{20} - 15.6^\circ$ in Et₂O.

Nitrile: $[\alpha]_D^{20} + 10^\circ$ in Et₂O.

Levene, Mori, *J. Biol. Chem.*, 1928, **78**, 5.

Fittig, Spenser, *Ann.*, 1894, **283**, 74.

3-Hydroxy-*n*-valeric Acid



C₅H₁₀O₃

MW, 118

Very unstable, readily reverting to lactone. $k = 2.02 \times 10^{-5}$ at 25°. $[\alpha]_D^{25} - 9.3^\circ$ in H₂O.

Et ester: b.p. 85–6°/2 mm. $D_4^{25} 0.9532$. $n_D^{25} 1.4265$. Misc. with EtOH, Et₂O. Insol. H₂O. Dist. at pressures greater than 2 mm. → 3-valerolactone.

Lactone: see 3-Valerolactone.

Amide: C₅H₁₁O₂N. MW, 117. Leaflets from EtOH–Et₂O. M.p. 56°. Sol. H₂O. Spar. sol. Et₂O, CHCl₃. Insol. C₆H₆, ligroin. Heat → 3-valerolactone.

Nitrile: b.p. 110–12°/18 mm. $[\alpha]_D^{21} + 13^\circ$ in EtOH.

Hydrazone: cryst. M.p. 61–2°. Loses N₂H₄ at 200°. Spar. sol. most org. solvents.

Levene, Haller, *J. Biol. Chem.*, 1928, **76**, 415.

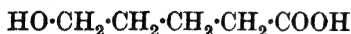
Lease, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 807.

Neugebauer, *Ann.*, 1885, **227**, 100.

Blaise, Luttringer, *Compt. rend.*, 1905, **140**, 792.

Barbier, Locquin, *Bull. Soc. chim.*, 1913, **13**, 226.

4-Hydroxy-*n*-valeric Acid (*ω*-Hydroxyvaleric acid)



C₅H₁₀O₃

MW, 118

Very unstable, readily reverting to lactone. $[\alpha]_D^{24} + 10.5^\circ$.

Me ether: C₆H₁₂O₃. MW, 132. B.p. 133–4°/15 mm. $D_4^{15} 1.0387$. $k = 1.91 \times 10^{-3}$ at 25°. *Me ester*: C₇H₁₄O₃. MW, 146. B.p. 185°. $D_4^{15} 0.9747$.

Et ether: b.p. 252°. Sol. H₂O.

Lactone: see 4-Valerolactone.

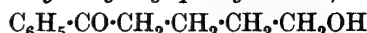
Amide: m.p. 56°. $[\alpha]_D^{23} + 9.5^\circ$ in EtOH.

Levene, Haller, *J. Biol. Chem.*, 1926, **69**, 169; 1928, **79**, 487.

Palomaa, *Chem. Zentr.*, 1912, II, 596.

Fittig, Beiswenger, *Ber.*, 1903, **36**, 1201.

ω-Hydroxyvalerophenone (4-Benzoylbutyl alcohol, 4-hydroxybutyl phenyl ketone)



C₁₁H₁₄O₂

MW, 178

Plates from H₂O. M.p. 40–1°. Sol. EtOH, MeOH, Et₂O, C₆H₆. Spar. sol. pet. ether.

Oxime: m.p. 56–7°.

Kipping, Perkin, *J. Chem. Soc.*, 1890, **57**, 311.

p-Hydroxyvalerophenone (*p*-Valerylphenol, butyl *p*-hydroxyphenyl ketone)



C₁₁H₁₄O₂

MW, 178

M.p. 63°. B.p. 210°/15 mm., 197.5–198.5°/10 mm.

Me ether: *p*-valerylanisole. C₁₂H₁₆O₂. MW, 192. Prisms. M.p. 27–8°. B.p. 196.5°/40 mm., 150.5°/6 mm. Sol. EtOH, Et₂O, pet. ether. *Phenylhydrazone*: m.p. 78°. *Semicarbazone*: m.p. 164°.

Et ether: *p*-valerylphenetole. C₁₃H₁₈O₂. MW, 206. Needles from EtOH. M.p. 31°. *Semicarbazone*: needles. M.p. 192°.

Benzoyl: m.p. 92°.

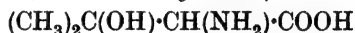
Sandulesco, Girard, *Bull. soc. chim.*, 1930, **47**, 1309.

Skraup, Nieten, *Ber.*, 1924, **57**, 1301.

Noller, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 1891.

Layraud, *Bull. soc. chim.*, 1907, **35**, 234.

2-Hydroxyvaline (2-Hydroxy-1-aminoisovaleric acid, 2 : 2-dimethylserine)



C₅H₁₁O₃N

MW, 133

Plates from EtOH.Aq. M.p. 218° decomp. Sol. H₂O. Insol. EtOH, Et₂O, C₆H₆, AcOEt.

Phenylurethane: m.p. 162°. Sol. EtOH, Et₂O, AcOEt.

β-Naphthalenesulphonyl deriv.: needles from EtOH. M.p. 261°.

Me ether: C₆H₁₃O₃N. MW, 147. Plates. M.p. 250–60° decomp. Sol. H₂O. Insol. EtOH, Et₂O, CHCl₃, AcOEt.

Schrauth, Geller, *Ber.*, 1922, **55**, 2789.

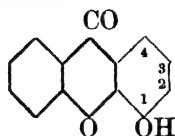
1-Hydroxyvinylacetic Acid.

See Vinylglycollic Acid.

Hydroxyvinyl phenyl Ketone.

See *ω*-Formylacetophenone.

1-Hydroxyxanthone

 $C_{13}H_8O_3$

MW, 212

Needles from EtOH.Aq. M.p. 242°. Sol. EtOH, Et₂O, AcOH. Mod. sol. hot C₆H₆. Spar. sol. H₂O, ligroin. Conc. H₂SO₄ → yellow sol. with green fluor. Sublimes.

Me ether: C₁₄H₁₀O₃. MW, 226. Needles from EtOH. M.p. 173°. Sol. Et₂O, C₆H₆. Mod. sol. hot EtOH, hot ligroin.

Acetyl: cryst. from EtOH.Aq. M.p. 137–8°.

Benzoyl: needles. M.p. 172°.

v. Kostanecki, Rutishauser, *Ber.*, 1892, 25, 1649.

Ullmann, Zlokasoff, *Ber.*, 1905, 38, 2118.

König, v. Kostanecki, *Ber.*, 1894, 27, 1996.

2-Hydroxyxanthone.

Needles from EtOH. M.p. 246° (242°). Sol. EtOH. Mod. sol. AcOH. Spar. sol. Et₂O, C₆H₆. Sol. alkalis. Conc. H₂SO₄ → yellow sol. with blue fluor. Zn dust dist. → xanthene.

Me ether: plates from EtOH.Aq. M.p. 129°. Sol. EtOH, C₆H₆, AcOH. Spar. sol. ligroin. Sol. conc. H₂SO₄ with blue fluor.

Acetyl: needles from EtOH.Aq. M.p. 157–8°.

Benzoyl: needles. M.p. 147°.

v. Kostanecki, Rutishauser, *Ber.*, 1892, 25, 1651.

Ullmann, Wagner, *Ann.*, 1907, 355, 370.

Atkinson, Heilbron, *J. Chem. Soc.*, 1926, 2689.

See also last reference above.

3-Hydroxyxanthone.

Yellow needles from EtOH.Aq. M.p. 240° (231°). Sol. EtOH, hot C₆H₆. Insol. H₂O, ligroin. Conc. H₂SO₄ → yellow sol. with blue fluor.

Me ether: needles from EtOH. M.p. 131°. Sol. EtOH, C₆H₆, AcOH. Conc. H₂SO₄ → yellow sol. with green fluor.

Acetyl: needles from EtOH.Aq. M.p. 161°.

Benzoyl: needles from EtOH. M.p. 151°.

v. Kostanecki, Rutishauser, *Ber.*, 1892, 25, 1648.

König, v. Kostanecki, *Ber.*, 1894, 27, 1996.

Ullmann, Zlokasoff, *Ber.*, 1905, 38, 2119.

Ullmann, Denzler, *Ber.*, 1906, 39, 4334.

4-Hydroxyxanthone.

Yellow needles from EtOH. M.p. 147°. Spar. sol. hot H₂O. Zn dust dist. → xanthene. KOH fusion → resorcinol + salicylic acid.

Me ether: yellow needles from C₆H₆-ligroin or EtOH. M.p. 138°. Sol. EtOH, C₆H₆, AcOH. Spar. sol. hot ligroin.

Acetyl: prisms from EtOH. M.p. 167–8°.

Benzoyl: needles from EtOH. M.p. 206.5°.

Michael, *Am. Chem. J.*, 1883, 5, 91.

Graebe, *Ann.*, 1889, 254, 290.

König, v. Kostanecki, *Ber.*, 1894, 27, 1996.

Ullmann, Pachaud, *Ann.*, 1906, 350, 113.

Tambor, *Ber.*, 1910, 43, 1883.

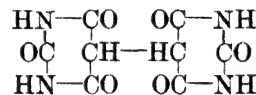
Hydroxy-xylene.

See Xylenol.

ω-Hydroxy-xylenol.

See Homosaligenin and Hydroxymethylbenzyl Alcohol.

Hydurilic Acid (5-5'-Dibarbituric acid)

 $C_8H_6O_6N_4$

MW, 254

Plates + 2H₂O from H₂O. M.p. 320–30° decomp. Spar. sol. H₂O. Prac. insol. most org. solvents. Heat of comb. C_p = 658.5 Cal. FeCl₃ → green col. Sol. conc. H₂SO₄, alkalis. HNO₃ → alloxan. Ox. → 5-hydroxyhyd-urilic acid → oxalic acid. HCl + KClO₃ → dichlorohydurilic acid.

Di-Me deriv: C₁₀H₁₀O₆N₄. MW, 282. Cryst. from H₂O. M.p. 306–8° decomp. Sol. 4 parts H₂O. Spar. sol. most org. solvents. FeCl₃ → green col. Ox. → hydroxydi-methylhydurilic acid.

Tetra-Me deriv: see Deoxyamalic Acid.

Biltz, Hamburger, *Ber.*, 1916, 49, 659.

Baeyer, *Ann.*, 1863, 127, 14.

Biltz, Heyn, *Ber.*, 1919, 52, 1302.

Conrad, *Ann.*, 1907, 356, 29.

Murdoch, Doebner, *Ber.*, 1876, 9, 1102.

Biltz, *Ann.*, 1914, 404, 188.

Roeder, *Ber.*, 1913, 46, 2563.

Hyenanchin

 $C_{15}H_{18}O_7$

MW, 310

Constituent of *Hyenanche globosa*, Lamb. Needles from H₂O. M.p. 234° decomp., darkens at 200°. Spar. sol. H₂O, EtOH, Me₂CO, AcOEt. $[\alpha]_D^{25} + 14.7^\circ$ in H₂O. Reduces Fehlings and NH₃.AgNO₃. Yellow ppt. with Br water. Yields no sugar on hyd. Boiled with alkalis → acetol. Gives no ketonic derivs.

Acetyl: needles from EtOH.Aq. M.p. 126°.

Henry, *J. Chem. Soc.*, 1920, **117**, 1620.

Hyenic Acid

$C_{25}H_{50}O_2$ MW, 382

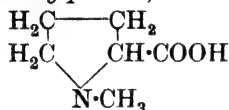
Occurs combined as glyceride in *Hyæna striata* and Montan wax. Needles from C_6H_6 . M.p. 77–8°. Sol. Et₂O. Spar. sol. EtOH.

Ca salt: cryst. powder. M.p. 85–90°.

Carius, *Ann.*, 1864, **129**, 168.

Tropsch, Kreutzer, *Chem. Zentr.*, 1922, IV, 561.

Hygric Acid (*N*-Methylpyrrolidine-2-carboxylic acid, *N*-methylproline)



$C_6H_{11}O_2N$ MW, 129

l-. Needles from CHCl_3 . M.p. 169–70°. Sol. H_2O , EtOH. Spar. sol. AcOEt, CHCl_3 . Insol. Et₂O, C_6H_6 . Reduces $\text{NH}_3 \cdot \text{AgNO}_3$. Dist. \rightarrow *N*-methylpyrrolidine. Hot conc. $\text{H}_2\text{SO}_4 \rightarrow$ pyridine and piperidine.

Me ester: $C_7H_{13}O_2N$. MW, 143. B.p. 69–72°/12 mm. $B, H, AuCl_4$: golden needles from H_2O . M.p. 84–6°.

Et ester: $C_8H_{15}O_2N$. MW, 157. B.p. 75–6°/12 mm. Sol. H_2O . $B, H, AuCl_4$: m.p. 110–5°.

Methiodide: prisms from EtOH–Et₂O. M.p. 88–9°. Sol. H_2O , EtOH. Spar. sol. AcOEt. Insol. Et₂O.

Methylamide: $C_7H_{14}ON_2$. MW, 142. Needles from pet. ether. M.p. 44–6°. Very hygroscopic. Sol. H_2O . $B, H, AuCl_4$: yellow needles from H_2O . M.p. 149–50°. B_2, H_2PtCl_6 : orange-red prisms from H_2O . M.p. 197–8°.

Picrate: prisms from H_2O . M.p. 214–16°.

B, HCl : leaflets from EtOH–Et₂O. M.p. 187–8°. Sol. H_2O , EtOH.

$B, H, AuCl_4$: yellow needles. M.p. 190° decomp.

l-.

Needles from EtOH–Et₂O. M.p. 116–17°. $[\alpha]_D^{18} = 80.1^\circ$ in H_2O .

Willstätter, Ettlinger, *Ann.*, 1903, **326**, 122.

Schulze, Trier, *Ber.*, 1909, **42**, 4654.

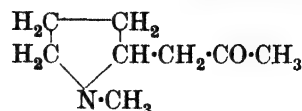
Trier, *Z. physiol. Chem.*, 1910, **67**, 328.

Karrer, Widmer, *Helv. Chim. Acta*, 1925, **8**, 368.

Hess, *Ber.*, 1913, **46**, 3114 (*Footnote*).

Hess, Eichel, Uibrig, *Ber.*, 1917, **50**, 355, 361.

Hygrine (*N*-Methyl-2-acetonylpyrrolidine)



$C_8H_{15}ON$

MW, 141

l-.

Occurs in Peruvian cusco leaves. B.p. 193–5°, 111–13°/50 mm., 92–4°/20 mm. Darkens in air. Decomp. on exposure to light. Absorbs CO_2 . $D_4^{17} 0.940$. $[\alpha]_D = 1.3^\circ$. $\text{CrO}_3 \rightarrow$ hygric acid.

Oxime: needles or plates from Et₂O. M.p. 116–20°.

Picrate: yellow needles. M.p. 158°.

dl-.

Oxime: m.p. 125°.

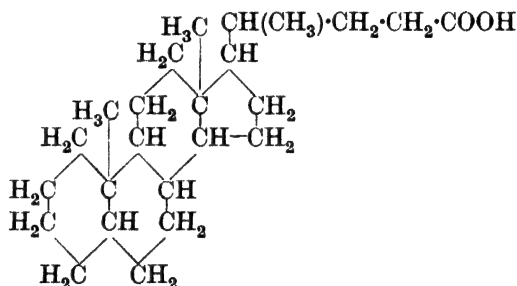
Picrate: yellow needles. M.p. 176°.

Liebermann, Kühling, *Ber.*, 1891, **24**, 407.

Liebermann, Cybulski, *Ber.*, 1895, **28**, 578.

Hess, *Ber.*, 1913, **46**, 3113, 4104.

Hyocholec Acid (*Isocholec Acid*)



$C_{24}H_{40}O_2$

MW, 360

Cryst. from AcOH. M.p. 162°. Stereoisomeric with cholic acid.

Me ester: $C_{25}H_{42}O_2$. MW, 374. Prisms from MeOH. M.p. 90–1°.

Et ester: $C_{26}H_{44}O_2$. MW, 388. Plates from MeOH. M.p. 84°.

Propyl ester: $C_{27}H_{46}O_2$. MW, 402. Needles from propyl alcohol. M.p. 101°.

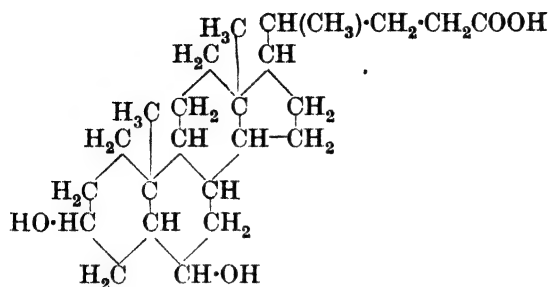
Butyl ester: $C_{28}H_{48}O_2$. MW, 416. Cryst. from Me_2CO . M.p. 87°.

Windaus, Bohné, *Ann.*, 1923, **433**, 284.

Windaus, Neukirchen, *Ber.*, 1919, **52**, 1915.

Hyocholec Acid.

See Hyodeoxycholic Acid.

Hyodeoxycholic Acid (*Hyocholic acid*, 3:6-dihydroxycholanolic acid) $\text{C}_{24}\text{H}_{40}\text{O}_4$

MW, 392

Occurs in bile of pig and wild boar. Cryst. from AcOEt. M.p. 196–7°. Mod. sol. EtOH, AcOH. Less sol. H_2O , Et_2O , Me_2CO , AcOEt, C_6H_6 .

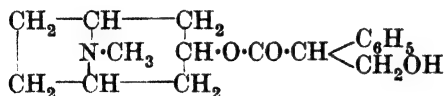
Diacytl: m.p. 106°. *Me ester*: m.p. 100°.

Windaus, Bohné, *Ann.*, 1923, **433**, 278.

Windaus, *Ann.*, 1926, **447**, 233.

Windaus, *Z. angew. Chem.*, 1923, **36**, 309.

Annual Reports on Progress of Chemistry, 1928, **25**, 158; 1933, **30**, 204.

Hyoscyamine (*Tropine ester of l-tropic acid*) $\text{C}_{17}\text{H}_{23}\text{O}_3\text{N}$

MW, 289

l-.

Occurs to about 1% in *Hyoscyamus muticus* (Egyptian henbane), mandragora root, henbane, etc. Needles from EtOH. M.p. 108.5°. Sol. EtOH, CHCl_3 , C_6H_6 . Less sol. H_2O , Et_2O . $[\alpha]_D^{15}$ — 22° in 50% EtOH. Resembles atropine in taste and mydriatic action but is physiologically more active. Racemises slowly in EtOH, rapidly on addition of alkali or on melting. $\text{H}_2\text{O} \rightarrow$ l-tropic acid + dl-tropine.

$\text{B}_2\text{H}_2\text{SO}_4\cdot 2\text{H}_2\text{O}$: needles from EtOH. M.p. anhyd. 206°. Sol. H_2O . Deliquescent.

$\text{B}\cdot\text{HBr}$: prisms. M.p. 151.8°. Deliquescent.

$\text{B}_2\text{H}_2\text{PtCl}_6$: orange prisms. M.p. 206°.

$\text{B}\cdot\text{HAuCl}_4$: yellow plates from dil. HCl. M.p. 165°.

$\text{B}\cdot\text{HAuBr}_4$: red needles. M.p. 115–20°.

$\text{B}_2(\text{COOH})_2$: m.p. 176°.

Methobromide: m.p. 210–12°.

Picrate: m.p. 165°.

dl-.

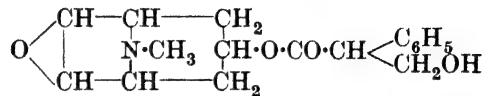
See Atropine.

Ladenburg, *Ann.*, 1880, **206**, 282.

Gadamer, *Arch. Pharm.*, 1901, **239**, 294.

Sandoz, E.P., 131,283, (*Chem. Abstracts*, 1920, **14**, 95).

Carr, Reynolds, *J. Chem. Soc.*, 1910, **97**, 1329.

Hyoscine (l-Scopolamine, scopoline (oscine) ester of l-tropic acid) $\text{C}_{17}\text{H}_{21}\text{O}_4\text{N}$

MW, 303

l-.

Occurs in plants of the *Solanaceae* family. Syrup. Sol. H_2O and most org. solvents. Less sol. C_6H_6 and pet. ether. $[\alpha]_D^{20}$ — 18° in EtOH, — 28° in H_2O . Powerful narcotic and mydriatic. Sedative in small doses. Racemised rapidly by alkalis. Gives white ppt. with $\text{HgCl}_2\cdot\text{Aq}$. Dil. acids or alkalis \rightarrow l-tropic acid + dl-scopoline (dl-oscine).

$\text{B}\cdot\text{HCl}$: m.p. 200°.

$\text{B}\cdot\text{HBr}\cdot 3\text{H}_2\text{O}$: m.p. anhyd. 193–4°. $[\alpha]_D^{15}$ — 15.72° in EtOH, — 25.9° in H_2O . Sol. H_2O , EtOH. Spar. sol. CHCl_3 . Insol. Et_2O .

$\text{B}\cdot\text{HAuCl}_4$: needles. M.p. 208–9° decomp. Spar. sol. H_2O .

$\text{B}\cdot\text{HAuBr}_4$: red leaflets. M.p. 191–2°.

Picrate: yellow needles. M.p. 187–8°.

d-.

Syrup.

$\text{B}\cdot\text{HBr}\cdot 3\text{H}_2\text{O}$: m.p. anhyd. 193–4°. $[\alpha]_D^{15}$ + 26.3 in H_2O .

$\text{B}\cdot\text{HAuCl}_4$: needles. M.p. 204–5° decomp.

Picrate: needles. M.p. 187–8° decomp.

dl-.

Scopolamine, atropine.

Needles + $1\text{H}_2\text{O}$, m.p. 56–7°: needles + $2\text{H}_2\text{O}$, m.p. 37–8°. Anhydrous compound is a syrup.

$\text{B}\cdot\text{HBr}\cdot 3\text{H}_2\text{O}$: m.p. 181–2° anhyd.

$\text{B}\cdot\text{HAuCl}_4$: needles. M.p. 214–15°.

$\text{B}\cdot\text{HAuBr}_4$: red leaflets. M.p. 209–10°.

Picrate: needles. M.p. 173.5–174.5°.

King, *J. Chem. Soc.*, 1919, **115**, 476.

Chemnitius, *J. prakt. chem.*, 1928, **120**, 221.

Ladenburg, *Ann.*, 1880, **206**, 299.

Schmidt, *Arch. Pharm.*, 1894, **232**, 409.

Carr, Reynolds, *J. Chem. Soc.*, 1912, **101**, 950.

Jowett, *J. Chem. Soc.*, 1897, **71**, 680.

Hypaconine.

See under Hypaconitine.

Hypaconitine $C_{33}H_{45}O_{10}N$

MW, 615

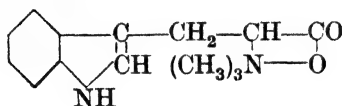
Alkaloid accompanying aconitine. Occurs abundantly in *Aconitum senanense*, Nakai. Prisms from Et_2O . M.p. 197.5–198.5°. $[\alpha]_D^{17} + 22.4^\circ$ in $CHCl_3$. Boiling H_2O at 160–70° → acetic acid, benzoic acid, and hypaconine (*tetraacetyl*: m.p. 182–4°). Boiling dil. H_2SO_4 → benzohypaconine ($B, HCl, 3\frac{1}{2}H_2O$: m.p. 242–4°. $[\alpha]_D^{19} - 6.5$ in H_2O). Heated in vacuo under N → pyrohypaconitine (m.p. 119–20°. $[\alpha]_D^{18} 18.1^\circ$). Ox. → hypoxonitine (m.p. 267–8° decomp. $[\alpha]_D^{15} - 63.1^\circ$ in $CHCl_3$).

$B, HBr, 2\frac{1}{2}H_2O$: cryst. from H_2O . M.p. 178–9°. $[\alpha]_D^{17} - 19.7^\circ$ in H_2O .

$B, HAuCl_4$: prisms from EtOH. M.p. 243–5°.

$B, HClO_4$: prisms from EtOH– Et_2O . M.p. 178–80° decomp. $[\alpha]_D^{15} - 11.2^\circ$ in EtOH.

Majima, Morio, *Ann.*, 1929, 476, 171, 210.

Hypaphorine $C_{14}H_{18}O_2N_2$

MW, 246

Cryst. from H_2O . M.p. anhyd. 255° decomp. Very sol. H_2O , EtOH. Insol. most other solvents. $[\alpha]_D + 91.3^\circ$ in H_2O .

B, HCl : m.p. 227°.

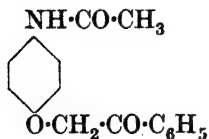
B, HBr : m.p. 225°.

B, HNO_3 : m.p. 215–20°. $[\alpha]_D + 94.7^\circ$. Spar. sol. H_2O .

Romburgh, Barger, *J. Chem. Soc.*, 1911, 99, 2069.

Marañon, Santos, *Chem. Abstracts*, 1932, 26, 5609.

Hypnoacetin (*p*-Hydroxyacetanilide phenacyl ether)

 $C_{16}H_{15}O_3N$

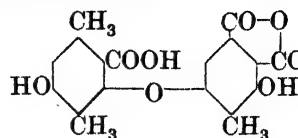
MW, 269

Plates from EtOH. M.p. about 160° decomp. Sol. EtOH. Spar. sol. $CHCl_3$, CS_2 , C_6H_6 . Insol. H_2O , Et_2O . Hypnotic and antipyretic.

Vignolo, *Atti accad. Lincei*, 1895, 4, i, 360; 1897, 6, i, 71.

Hypnone.

See Acetophenone.

Hyposalazinic Acid $C_{18}H_{14}O_8$

MW, 358

Prisms from Me_2CO . M.p. 280° decomp. Sol. EtOH, Me_2CO . Alc. $FeCl_3$ → red col. Sol. conc. H_2SO_4 to deep red sol. Sol. alkalis to yellow sols. which slowly darken. KOH fusion → 3:5-dihydroxy-*p*-toluic acid.

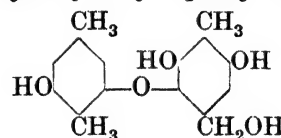
Di-Me ether: *Me ester*, $C_{21}H_{20}O_8$. MW, 400. Leaflets from Me_2CO . M.p. 165°. Sol. EtOH, Me_2CO . No col. with $FeCl_3$.

Penta-Me deriv.: $C_{23}H_{24}O_8$. MW, 428. Needles from EtOH. M.p. 146°.

Asahina, Asano, *Ber.*, 1933, 66, 696, 1215.

Asahina, Tanase, *Ber.*, 1934, 67, 1435.

Hyposalazinol (4:6:3'-Trihydroxy-5:2:5'-trimethyl-2-hydroxymethyl-diphenyl ether)

 $C_{16}H_{18}O_5$

MW, 290

Needles from H_2O . M.p. 197°. KOH fusion → 3:5-dihydroxy-*p*-toluic acid + β -orcinol. $H(+Pd)$ → deoxyhyposalazinol.

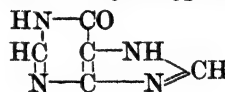
Tri-Me ether: $C_{19}H_{24}O_5$. MW, 332. M.p. 146°.

Asahina, Asano, *Ber.*, 1933, 66, 895.

Hypotonin.

See under Ethylenediamine.

Hypoxanthine (6-Hydroxypurine, sarcine)

 $C_5H_4ON_4$

MW, 136

Occurs in mustard, black pepper, potato, yeast, beetroot, bone marrow, and in extracts of muscle, spleen, liver, etc. Needles. De-comp. at 150°. Spar. sol. cold H_2O , more sol. hot. Ppd. by $PdCl_2$ as co-ordinated comp. Forms cryst. salts with acids and with some bases.

Thyminoside: see Inosin.

Fischer, *Ber.*, 1897, 30, 2226.

Traube, *Ann.*, 1904, 331, 78.

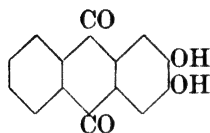
Sundwik, *Z. physiol. Chem.*, 1912, 76, 486.

Hypoxonitine.

See under Hypaconitine.

Hyalrite.

See under Formaldehyde.

Hystazarin (2:3-Dihydroxyanthraquinone, hystazine) $C_{14}H_8O_4$

MW, 240

Yellow needles from AcOH. M.p. above 260° . Spar. sol. most org. solvents. Insol. C_6H_6 . Sol. caustic alkalis to bright blue sols. Sol. NH_3 . Aq. to violet-blue sol. Violet-red sol. in conc. H_2SO_4 . Green col. with $FeCl_3$ in EtOH. Zn dust dist. \rightarrow anthracene. $H_2SO_4 + HNO_3 \rightarrow$ 1-nitro- and 1:4-dinitro derivs.

Mono-Me ether: $C_{15}H_{10}O_4$. MW, 254. Orange yellow needles from EtOH or plates from C_6H_6 . M.p. 236° .

Di-Me ether: $C_{16}H_{12}O_4$. MW, 268. Yellow needles from EtOH or AcOH. M.p. 237° . Spar. sol. EtOH. $Zn + NH_4OH \rightarrow$ 2:3-dimethoxyanthracene.

Mono-Et ether: $C_{16}H_{12}O_4$. MW, 268. Yellow needles from EtOH. M.p. $234-40^\circ$.

Di-Et ether: $C_{18}H_{16}O_4$. MW, 296. Yellow needles from EtOH. M.p. $160-3^\circ$.

Diacetyl: yellow needles from AcOH. M.p. $205-7^\circ$.

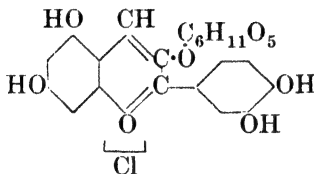
Bayer, D.R.P., 298,345, (*Chem. Zentr.*, 1917, II, 256).

Liebermann, *Ber.*, 1888, 21, 2501.

Schoeller, *ibid.*, 2503.

Liebermann, Hohenemser, *Ber.*, 1902, 35, 1778.

Lagodzinski, *Ann.*, 1905, 342, 102.

I**Idaein chloride** $C_{21}H_{21}O_{11}Cl$

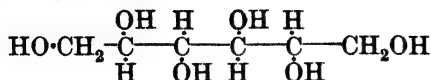
MW, 484.5

Galactoside occurring in cranberry (*Vaccinium vitis idaea*, Linn.). Reddish-brown prisms (+ H_2O) with green reflex. M.p. 210° decomp. Sol. $H_2O \rightarrow$ dark reddish-brown sol., dilution \rightarrow orange-red. $NaOH \rightarrow$ blue \rightarrow green \rightarrow yellow sol. $Na_2CO_3 \rightarrow$ violet sol. $FeCl_3$ in EtOH \rightarrow blue col., violet on dilution.

Grove, Robinson, *J. Chem. Soc.*, 1931, 2722.

Idite.

See Iditol.

Iditol (Idite) $C_6H_{14}O_6$

MW, 182

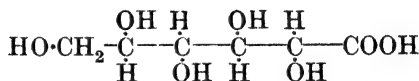
d. Sorbierite.

Prisms from EtOH. M.p. $73-4^\circ$. $[\alpha]_D^{20} -3.53^\circ$ in H_2O .

l.

Prisms from EtOH. M.p. 73.5° . $[\alpha]_D^{20} +3.5^\circ$ in H_2O . Hygroscopic.

Fischer, Fay, *Ber.*, 1895, 28, 1979, 1982.

l-Idonic Acid $C_6H_{12}O_7$

MW, 196

Brucine salt: m.p. $190-5^\circ$.

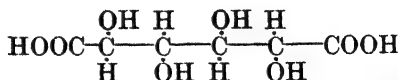
Quinine salt: m.p. 158° .

Strychnine salt: m.p. $120-5^\circ$.

Phenylhydrazide: m.p. $100-10^\circ$.

Nef, *Ann.*, 1914, 403, 271.

Fischer, Fay, *Ber.*, 1895, 28, 1975, 1981.

Idosaccharic Acid $C_6H_{10}O_8$

MW, 210

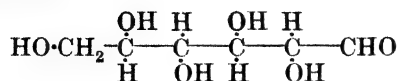
d.

Syrup. Dextrorotatory.

Cu salt, $2H_2O$: prisms. Turns deep blue on heating.

Phenylhydrazide: m.p. $217-18^\circ$ decomp.

l-.

Syrup. Sol. H₂O. Lævorotatory.Behrend, *Ber.*, 1916, **49**, 1001.Behrend, Heyer, *Ann.*, 1919, **418**, 314.**d-Idose**C₆H₁₂O₆

MW, 180

Osazone : m.p. 168°.

Ohlo, Vargha, *Ber.*, 1929, **62**, 2443.**Idryl.**

See Fluoranthrene.

Ignotine.Carnosine, *q.v.***Ilcyl Alcohol.**

See α-Amyrin.

Illipene (Karitene).

Hydrocarbon occurring in unsaponifiable portion of shea butter and illipé butter. Various formulæ (C₃₂H₅₈, C₆₄H₁₀₆, C₆₅H₁₀₈, etc.) have been given to it. M.p. 64.5° (64°). B.p. 315°/2.5 mm. Sol. CHCl₃. Mod. sol. Me₂CO, hot Et₂O. Spar. sol. EtOH. Vac. dist. → isoprene + dipentene. O₃ → levulinic acid + levulinic aldehyde + acetic acid.

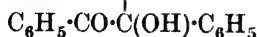
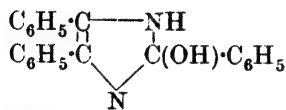
Bauer, Umbach, *Ber.*, 1932, **65**, 859 (*Bibl.*).

Illuric AcidC₂₀H₂₈O₃

MW, 316

Occurs in copaiba balsam. Plates from EtOH. M.p. 128–9°. Sol. hot in ord. org. solvents. Spar. sol. AcOH, pet. ether. [α]_D¹⁸ – 54.89° in EtOH.

Tschirch, Keto, *Chem. Zentr.*, 1901, II, 1227.

ImabenzilC₃₅H₂₈O₃N₂

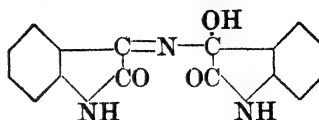
MW, 524

Cryst. from MeOH. M.p. 194° (195°). Sol. AcOH with decomp. Insol. EtOH, Et₂O. CrO₃ → C₆H₅·CHO + C₆H₅·COOH + benzilimide.

Pinner, *Ber.*, 1902, **35**, 4138.

Imasatic Acid.

See Isamic Acid.

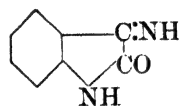
Imasatin (Isamic acid lactam)C₁₆H₁₁O₃N

MW, 293

Yellow cryst. M.p. 230° (sinters at 200°).

Spar. sol. ord. org. solvents. Insol. H₂O.

Monobenzoyl deriv. : m.p. 240°.

Reissert, Hoppmann, *Ber.*, 1924, **57**, 980.**Imesatin (Isatin-3-imide, 3-iminoisatin)**C₈H₆ON₂

MW, 146

Yellow prisms. M.p. 175–6°. Sol. EtOH, hot H₂O. Spar. sol. Et₂O. Insol. C₆H₆, ligroin.

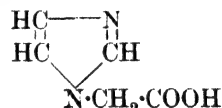
Reissert, Hoppmann, *Ber.*, 1924, **57**, 976.

Iminazole.

See Glyoxaline.

Iminazolone.

See Glyoxalone.

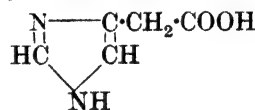
1-Iminazolylicetic AcidC₅H₆O₂N₂

MW, 126

Prisms. M.p. 268–9° decomp.

Et ester : C₇H₁₀O₂N₂. MW, 154. Picrate : m.p. 124–5°.

Easson, Pyman, *J. Chem. Soc.*, 1932, 1811.

4-Iminazolylicetic AcidC₅H₆O₂N₂

MW, 126

Needles + 1H₂O. M.p. 222° decomp.

Et ester : C₇H₁₀O₂N₂. MW, 154. B, HCl : m.p. 115–17°. Acid oxalate : m.p. 180° decomp.

Chloride : C₅H₅ON₂Cl. MW, 144.5. B, HCl : m.p. 127°.

Nitrile : C₅H₅N₃. MW, 107. M.p. 138–40°. B, HCl : m.p. 168–9°. Acid oxalate : decomp. at 194°. Picrate : m.p. 165–6°.

B, HCl : m.p. 225–6°.

Picrate : m.p. 212–13°.

Hydrazide: m.p. 189°. *B,2HCl*: m.p. 230°.
Fargher, Pyman, *J. Chem. Soc.*, 1919,
115, 1019.

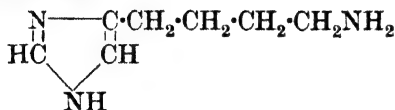
Iminazolylacrylic Acid.

See Urocanic Acid.

Iminazoly- α -alanine.

See Histidine.

4-[4-Iminazoly]-*n*-butylamine (4- ω -Amino-*butylglyoxaline*)



$C_7H_{13}N_3$

MW, 139

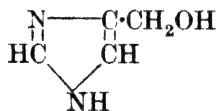
M.p. 51-3°.

*B,2(COOH)*₂: m.p. 168.5-170°.

Dipicrate: m.p. 197.5-198.5°.

Akabori, Kaneko, *Chem. Abstracts*, 1933,
27, 293.

4-Iminazolylicarbinol (4-Hydroxymethylgly-*oxaline*)



$C_4H_6ON_2$

MW, 98

Cryst. M.p. 98.5° (93-4°).

B,HCl: m.p. 93° (107-9°).

Nitrate: m.p. 84-6°.

Acid oxalate: m.p. anhyd. 134-6°.

Et ether: $C_6H_{10}ON_2$. MW, 126. M.p. 53-5°.

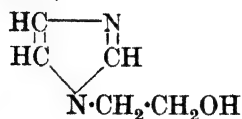
Acid oxalate: m.p. 165-70°.

Picrate: m.p. 205-6° (207° decomp.).

Yabuta, Kambe, *Chem. Abstracts*, 1933,
27, 1882.

Parrod, *Bull. soc. chim.*, 1932, 51, 1424.

2-[1-Iminazoly]-ethyl Alcohol (1- β -Hydr-*oxyethylglyoxaline*)



$C_5H_8ON_2$

MW, 112

M.p. 36-40°. B.p. 202-6°/20 mm. Sol. H_2O ,
 Et_2O .

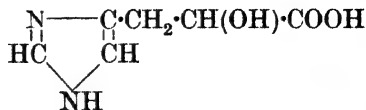
Picrate: m.p. 142-3°.

Esson, Pyman, *J. Chem. Soc.*, 1932,
1811.

2-[4-Iminazoly]-ethylamine.

See 4-[ω -Aminoethyl]-glyoxaline.

2-[4-Iminazoly]-lactic Acid (*Hydroxydes-aminohistidine*, 1-hydroxy-2-iminazolypropionic acid)



$C_6H_8O_3N_2$

MW, 156

Prisms + $1H_2O$. M.p. 222°.

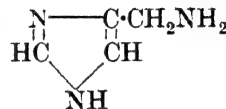
Et ester: $C_8H_{12}O_3N_2$. MW, 184. Cryst.
from $CHCl_3$. M.p. 118-19°. Sol. H_2O , $EtOH$.
Insol. Et_2O .

Fargher, Pyman, *J. Chem. Soc.*, 1919,
115, 1020.

Hirai, *Chem. Abstracts*, 1920, 14, 1694.

Pyman, *J. Chem. Soc.*, 1911, 99, 1400.

4-Iminazolylmethylamine (4-Aminomethyl-*glyoxaline*)



$C_4H_7N_3$

MW, 97

B,2HCl: prisms from MeOH. Softens at
236°.

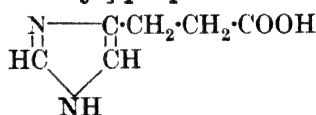
B,H2PtCl6: blackens at 288°.

Dipicrate: m.p. 209°.

Picrolonate: m.p. 273° decomp.

Windaus, Opitz, *Ber.*, 1911, 44, 1721.

2-[4-Iminazoly]-propionic Acid



$C_6H_8O_2N_2$

MW, 140

Cryst. from butyl alcohol- H_2O . M.p. 206-8°.

Et ester: $C_8H_{12}O_2N_2$. MW, 168. B.p. 143-
52°/0.05-0.07 mm. *Acid oxalate*: m.p. 159-260°.

Hydrazide: m.p. 142-3°.

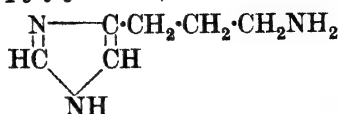
Anilide: m.p. 190-1°. *Dibenzoyl deriv.*: m.p.
197°.

Platinichloride: m.p. 208-9°.

Akabori, *Ber.*, 1933, 66, 156.

Windaus, *Ber.*, 1910, 43, 499.

3-[4-Iminazoly]-propylamine (4- ω -*Aminopropylglyoxaline*)



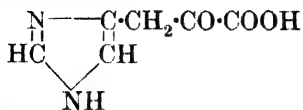
$C_6H_{11}N_3$

MW, 125

Dipicrate: m.p. 244–244.5°.

Akabori, Kaneko, *Chem. Abstracts*, 1933, 27, 293.

4-Iminazolympyruvic Acid



$\text{C}_6\text{H}_6\text{O}_3\text{N}_2$

MW, 154

B, HCl: froths at 108°. M.p. 241°.

Barger, Stewart, *Chem. Abstracts*, 1927, 21, 91.

Iminoantipyrine.

See Iminopyrrole.

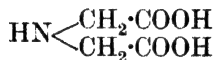
2-Iminobutyric Acid.

See 2-Aminocrotonic Acid.

2-Iminobutyronitrile.

See Acetodinitrile.

Iminodiacetic Acid (*Diglycolamidic acid, dicarboxydimethylamine, dimethylamine-dicarboxylic acid*)



$\text{C}_4\text{H}_7\text{O}_4\text{N}$

MW, 133

M.p. 247.5° (225° decomp.). Spar. sol. H_2O . Insol. EtOH. Heat of comb. 396.3 Cal.

Di-Me ester: $\text{C}_6\text{H}_{11}\text{O}_4\text{N}$. MW, 161. B.p. 126°/33 mm. *B, HI*: decomp. at 185°.

B, HNO₃: m.p. 198–9°. *N-Benzoyl*: m.p. 73–6°.

Mono-Et ester: $\text{C}_6\text{H}_{11}\text{O}_4\text{N}$. MW, 161. M.p. 175–6° decomp. *B, HCl*: m.p. 143°.

Di-Et ester: $\text{C}_8\text{H}_{15}\text{O}_4\text{N}$. MW, 189. B.p. 133°/11 mm., 128°/10 mm. *B, HCl*: m.p. 73–5°. *Dihydrazide*: m.p. 133°; *triacyetyl deriv.*: m.p. 204–5°.

Dibutyl ester: $\text{C}_{12}\text{H}_{23}\text{O}_4\text{N}$. MW, 245. B.p. 167–8°/13 mm. D_4^{18} 1.0086. n_D^{18} 1.4405.

Monoamide: $\text{C}_4\text{H}_8\text{O}_3\text{N}_2$. MW, 132. *N-Benzoyl*: m.p. 190–1°.

Diamide: $\text{C}_4\text{H}_8\text{O}_2\text{N}_3$. MW, 131. Plates from H_2O . M.p. 143°. *B, HCl*: m.p. 234–6°. *B, HNO₃*: m.p. 206° decomp. *N-Benzoyl*: m.p. 225–7°.

Dinitrile: dicyanodimethylamine. $\text{C}_4\text{H}_5\text{N}_3$. MW, 95. M.p. 75° (77°). *N-Nitroso*: m.p. 43°. *N-Benzoyl*: m.p. 131–2°. *B, HNO₃*: m.p. 134–5°.

Dianilide: m.p. 140–5°.

N-Acetyl: see Acetylminodiacetic Acid.

N-Benzoyl, $1\text{H}_2\text{O}$: m.p. 88–90°.

N-Me: see Methylminodiacetic Acid.

B, HCl: m.p. 238° decomp.

B, HNO₃: m.p. 130–5°.

Curtius, Hofmann, *J. prakt. Chem.*, 1917, 96, 202.

Keimatsu, Kato, *Chem. Abstracts*, 1930, 24, 70.

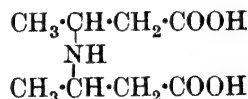
I.G., F.P., 746,641, (*Chem. Abstracts*, 1933, 27, 4542).

Dubsky, Hoher, *Ber.*, 1921, 54, 2667.

Iminodiacetophenone.

See Diphenacylamine.

2 : 2'-Iminodibutyric Acid (*Dicarboxydi-isopropylamine, di-isopropylamine-dicarboxylic acid*)



$\text{C}_8\text{H}_{15}\text{O}_4\text{N}$

MW, 189

d.

M.p. 179–80° decomp. $[\alpha]_D^{20} + 65.5^\circ$ in H_2O .

Di-Me ester: $\text{C}_{10}\text{H}_{19}\text{O}_4\text{N}$. MW, 217. *B, HCl*: m.p. 163–4°. $[\alpha]_D^{20} + 42.10$ in MeOH. *Chloroplatinate*: m.p. 200–1° decomp.

l.

Plates from EtOH. Aq. M.p. 179–80° decomp. $[\alpha]_D^{20} - 65.3^\circ$ in H_2O .

Di-Me ester: *B, HCl*, m.p. 163–4°. $[\alpha]_D^{20} - 42.2^\circ$ in MeOH. *Chloroplatinate*: m.p. 200–1° decomp.

dl.

M.p. 158–60°.

Di-Me ester: *B, HCl*, m.p. 142–3°. *Chloroplatinate*: m.p. 195–6° decomp.

meso.

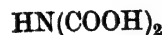
Cryst. from MeOH. M.p. 177–8° decomp. Sol. H_2O , hot MeOH. Spar. sol. EtOH.

Di-Me ester: b.p. 130°/10 mm. *B, HCl*: m.p. 114–15°. *Chloroplatinate*: m.p. 134–5°.

Di-Et ester: $\text{C}_{12}\text{H}_{23}\text{O}_4\text{N}$. MW, 245. B.p. 150–150.5°/15 mm.

Scheibler, Magasanik, *Ber.*, 1915, 48, 1810.

Iminodicarboxylic Acid



$\text{C}_2\text{H}_3\text{O}_4\text{N}$

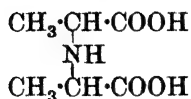
MW, 105

Me-Et ester: see Carbomethoxyurethane.

Di-Et ester: see Carbethoxyurethane.

See also I.G., D.R.P., 536,446, (*Chem. Abstracts*, 1932, 26, 996).

1 : 1'-Iminodipropionic Acid (*Diethylamine-1 : 1'-dicarboxylic acid, 1 : 1'-dicarboxydiethylamine*)



$\text{C}_6\text{H}_{11}\text{O}_4\text{N}$

MW, 161

Exists in two forms.

(I) M.p. 254–5°. Sol. H_2O . Insol. ord. org. solvents.

Di-Et ester: $\text{C}_{10}\text{H}_{19}\text{O}_4\text{N}$. MW, 217. B.p. 123–4°/15 mm.

Monoamide: $\text{C}_6\text{H}_{12}\text{O}_3\text{N}_2$. MW, 160. M.p. 232°.

Dinitrile: 1 : 1'-dicyanodiethylamine. $\text{C}_6\text{H}_9\text{N}_3$. MW, 123. M.p. 68°.

(II) Needles from H_2O . M.p. 234–5° decomp. Sol. H_2O . Insol. EtOH.

Di-Me ester: $\text{C}_8\text{H}_{15}\text{O}_4\text{N}$. MW, 189. B.p. 122–4°/30 mm.

Di-Et ester: m.p. – 5°. B.p. 121–2°/15 mm., 114–15°/10 mm. D_4^{20} 1.0152. n_D^{20} 1.4728.

Monoamide, $1\frac{1}{2}\text{H}_2\text{O}$: m.p. 210°.

Diamide: $\text{C}_6\text{H}_{13}\text{O}_2\text{N}_3$. MW, 159. M.p. 127°.

Imide: $\text{C}_6\text{H}_{10}\text{O}_2\text{N}_2$. MW, 142. M.p. 186°.

N-Acetyl: m.p. 174°.

Dinitrile: m.p. 68°.

B, HNO₃: decomp. at 125–40°.

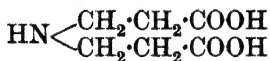
Zelinsky, Annenkoff, Kulikoff, *Z. physiol. Chem.*, 1911, **73**, 463.

Dubsky, *Ber.*, 1916, **49**, 1045.

Abderhalden, Haase, *Z. physiol. Chem.*, 1931, **202**, 49.

Ciamicic, Silber, *Ber.*, 1906, **39**, 3957.

2 : 2'-Iminodipropionic Acid (*Diethylamine-2 : 2'-dicarboxylic acid, 2 : 2'-dicarboxydiethylamine*)



$\text{C}_6\text{H}_{11}\text{O}_4\text{N}$

MW, 161

Syrup.

Di-Et ester: $\text{C}_{10}\text{H}_{19}\text{O}_4\text{N}$. MW, 217. B.p. 137–8°/12 mm., 112–14°/0.2 mm. D_{20}^{20} 1.0462. n_D^{20} 1.43802. *B, HCl*: m.p. 79.5–80.5°.

Kuettel, McElvain, *J. Am. Chem. Soc.*, 1931, **53**, 2694.

Ruzicka, Fornasir, *Helv. Chim. Acta*, 1920, **3**, 814.

2-Iminoglutarimide.

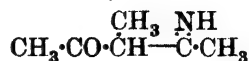
See Glutazine.

Iminoisatin.

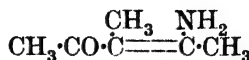
See Imesatin.

Dict. of Org. Comp.—II.

2-Imino-3-methylpentanone-4 (*2-Amino-3-methylpenten-2-one-4*)



or



$\text{C}_6\text{H}_{11}\text{ON}$

MW, 113

Prisms from CHCl_3 . M.p. 110° (105°). B.p. 225°. Sol. EtOH, CHCl_3 . NaOH in sealed tube at 100° $\rightarrow \text{NH}_3 + \text{CH}_3\cdot\text{COOH} + \text{CH}_3\cdot\text{CO}\cdot\text{C}_2\text{H}_5$. FeCl_3 in EtOH \rightarrow dark blue col.

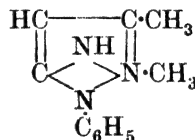
Claisen, *Ber.*, 1891, **24**, 3916.

Combes, *Bull. soc. chim.*, 1892, **7**, 783.

2-Imino-1-methyl-*n*-valeronitrile.

See Propiodinitrile.

Iminopyrine (*Iminoantipyrene*)



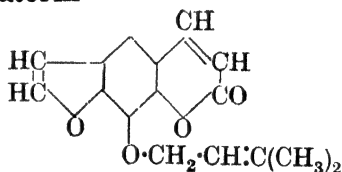
$\text{C}_{11}\text{H}_{13}\text{N}_3$

MW, 187

Needles from toluene. M.p. 116°. Sol. EtOH, Et₂O. Insol. H_2O .

Michaelis, Gunkel, *Ber.*, 1901, **34**, 726.

Imperatorin



$\text{C}_{16}\text{H}_{14}\text{O}_4$

MW, 270

Occurs in root of *Imperatoria ostruthium*, Linn. M.p. 102°. Sol. ord. org. solvents. Insol. H_2O .

Späth, Holzen, *Ber.*, 1935, **68**, 1123 (*Bibl.*).

Incarnatrin.

See under Quercitin.

Incarnatyl Alcohol

$\text{C}_{34}\text{H}_{70}\text{O}$

MW, 494

Needles from EtOH–AcOEt. M.p. 72–4°. Benzoyl deriv.: m.p. 58–60°.

Fargher, Probert, *Chem. Abstracts*, 1923, **17**, 1891.

Indanaldehyde.

See Hydrindene-aldehyde.

Indanamine.

See Hydrindamine.

Indane.

See Hydrindene.

Indane-carboxylic Acid.

See Hydrindenic Acid.

Indane-dicarboxylic Acid.

See Hydrindene-dicarboxylic Acid.

Indane-sulphonic Acid.

See Hydrindene-sulphonic Acid.

Indandione.

See Diketohydrindene.

Indanol.

See Hydroxyhydrindene.

1-Indanol-2-acetic Acid.

See 1-Hydroxyhydrindenyl-2-acetic Acid.

1-Indanol-2-malonic Acid.

See 1-Hydroxyhydrindenyl-2-malonic Acid.

1-Indanol-2- α -propionic Acid.

See α -1-Hydroxyhydrindenyl-2-propionic Acid.

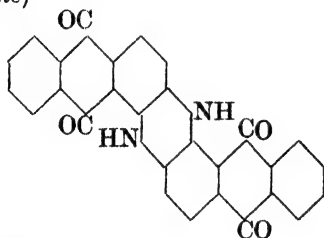
Indanone.

See Hydrindone.

Indanthrene.

See Indanthrone.

Indanthrone (*Anthraquinone-dihydroazine, indanthrene*)



$C_{28}H_{14}O_4N_2$

MW, 442

Blue needles with metallic lustre. Decomp. at 470–500°. Greenish-blue col. in $PhNO_2$ or aniline. Blue col. in quinoline. Indanthrone and its many derivatives are widely used as vat dyestuffs, indanthrone itself (Indanthrene Blue) being the first one to be made commercially.

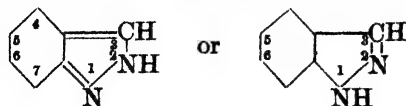
Terres, *Ber.*, 1913, **46**, 1634.

Schwenk, *Chem.-Ztg.*, 1928, **52**, 45.

Société pour l'industrie chimique à Bâle, F.P., 746,227, (*Chem. Abstracts*, 1933, **27**, 4547).

Maki, *Chem. Abstracts*, 1933, **27**, 2685.

Scholl, Berblinger, *Ber.*, 1903, **36**, 3427.

Indazole (*Benz-1:2-diazole, benzpyrazole*)

$C_7H_6N_2$

MW, 118

Needles from hot H_2O . M.p. 146–5°. B.p. 267–70°/743 mm. Sol. $EtOH$, Et_2O , hot H_2O .

1-Acetyl: m.p. 42°.

1-Benzoyl: m.p. 92–3°.

2-o-Nitrobenzoyl: stable form, m.p. 186–7°. Labile form, m.p. 141–2°.

2-m-Nitrobenzoyl: stable form, m.p. 134°. Labile form, m.p. 142–4°.

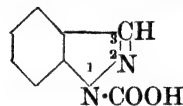
2-p-Nitrobenzoyl: stable form, m.p. 164–5°. Labile form, m.p. 137–8°.

Auwers, Frese, *Ann.*, 1926, **450**, 289.

Auwers, Allardt, *Ann.*, 1924, **438**, 19.

Meisenheimer, Diedrich, *Ber.*, 1924, **57**, 1715.

Auwers, *ibid.*, 1723.

Indazole-1-carboxylic Acid

$C_8H_6O_2N_2$

MW, 162

Me ester: $C_9H_8O_2N_2$. MW, 176. M.p. 59–60°.

Auwers, Frese, *Ann.*, 1926, **450**, 287.

Indazole-2-carboxylic Acid.

Me ester: $C_9H_8O_2N_2$. MW, 176. M.p. 60°.

Phenyl ester: $C_{14}H_{10}O_2N_2$. MW, 238. M.p. 91°.

o-Nitrophenyl ester: $C_{14}H_9O_4N_3$. MW, 283. M.p. 97–8°.

Chloride: $C_8H_5ON_2Cl$. MW, 180.5. M.p. 73–4°.

Amide: $C_8H_7ON_3$. MW, 161. M.p. 167°.

Anilide: stable form, m.p. 104–5°. Labile form, m.p. 105–6°.

Auwers, Allardt, *Ann.*, 1924, **438**, 25.

Indazole-3-carboxylic Acid.

Cryst. M.p. 266–266.5°.

1-N-Me: $C_9H_8O_2N_2$. MW, 176. M.p. 213–14°.

2-N-Me: m.p. 225–6°.

Brucine salt: m.p. 236–236.5°. $[\alpha]_D^{25} - 102^\circ$.

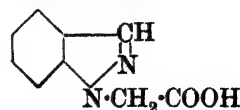
Cinchonine salt: m.p. 233.5–234°.

Quinine salt: m.p. 245–6°.

Hayashi, *Chem. Abstracts*, 1931, **25**, 1824.

Indazolol.

See Hydroxyindazole.

1-Indazylacetic Acid

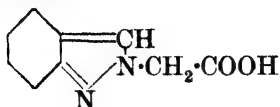
$C_9H_8O_2N_2$

MW, 176

Needles from H_2O . M.p. 185–6°. Sol. EtOH, AcOH.

Auwers, Allardt, *Ber.*, 1926, 59, 96.

2-Indazylacetic Acid



$C_9H_8O_2N_2$

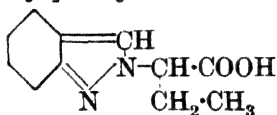
MW, 176

M.p. 257° decomp.

Et ester: $C_{11}H_{12}O_2N_2$. MW, 204. M.p. 54–54.5°. B.p. 175–7°/11 mm. *Picrate*: m.p. 164.5°.

See previous reference.

1-[2-Indazyl]-butyric Acid



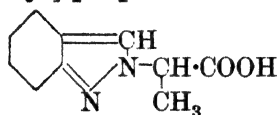
$C_{11}H_{12}O_2N_2$

MW, 204

Cryst. from C_6H_6 . M.p. 143–5°. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Auwers, Kleiner, *J. prakt. Chem.*, 1928, 118, 79.

1-[2-Indazyl]-propionic Acid



$C_{10}H_{10}O_2N_2$

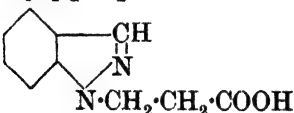
MW, 190

Cryst. from H_2O . M.p. 209° decomp. Sol. AcOH. Spar. sol. Et_2O , C_6H_6 .

Et ester: $C_{12}H_{14}O_2N_2$. MW, 218. B.p. 172°/11 mm. *Picrate*: m.p. 141–2°.

Auwers, Allardt, *Ber.*, 1926, 59, 98.

2-[1-Indazyl]-propionic Acid



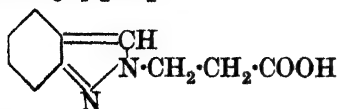
$C_{10}H_{10}O_2N_2$

MW, 190

Cryst. from C_6H_6 -pet. ether. M.p. 105.5–106.5°. Sol. EtOH, Et_2O , C_6H_6 . Insol. pet. ether.

Auwers, Kleiner, *J. prakt. Chem.*, 1928, 118, 77.

2-[2-Indazyl]-propionic Acid



$C_{10}H_{10}O_2N_2$

MW, 190

Needles from H_2O . M.p. 148–9°. Sol. EtOH, Et_2O . Insol. pet. ether.

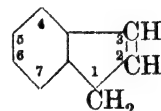
Et ester: $C_{12}H_{14}O_2N_2$. MW, 218. B.p. 206–7°/17 mm. $D_4^{15.2}$ 1.453. *Picrate*: m.p. 126.5–127°.

Picrate: m.p. 170°.

Auwers, Kleiner, *J. prakt. Chem.*, 1928, 118, 77.

Auwers, Allardt, *Ber.*, 1926, 59, 100.

Indene



C_9H_8

MW, 116

Constituent of crude benzole fraction of coal tar. M.p. –2°. B.p. 182.2–182.4°/761 mm. D_4^{20} 0.9915, D_4^{15} 1.0002. $n_D^{18.5}$ 1.5773. Sol. C_6H_6 . Non-volatile in steam. Turns yellow on standing but loses this colour on exposure to sunlight. Readily polymerises to form resinous products. Conc. H_2SO_4 gives the resin *para-indene*. $Na + EtOH \rightarrow$ hydrindene. Readily oxidises. Reacts with sulphur to give complex compounds. Shows weak acid and reducing properties. The indene resins are commercial products, usually produced direct from the heavy benzole fractions of coal tar which also contain coumarone (*q.v.*). The resins are thus mixtures of indene and coumarone polymers.

Picrate: m.p. 96°.

Stobbe, Färber, *Ber.*, 1924, 57, 1838.

Staudinger, *Helv. Chim. Acta*, 1929, 12, 934.

Bergmann, Taubadel, *Ber.*, 1932, 65, 463. Ellis, Rabinovitz, *Ind. Eng. Chem.*, 1916, 8, 797.

Courtot, Dondelinger, *Ann. chim.*, 1925, 4, 231.

Courtot, *Chem. Abstracts*, 1924, 18, 2699 (Review).

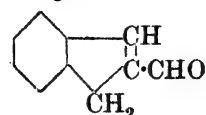
Cortese, *Rec. trav. chim.*, 1929, 48, 564.

Staudinger, D.R.P., 504,215, (*Chem. Abstracts*), 1930, 24, 5518).

Fazi, *Gazz. chim. ital.*, 1931, 61, 131 (Review, *Bibl.*).

Jacobi, *J. prakt. Chem.*, 1931, 129, 55 (Review).

Indene-2-aldehyde



$C_{10}H_8O$

MW, 144

M.p. 50–1°.

Oxime: m.p. 125–7°.

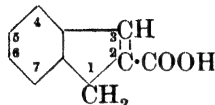
Semicarbazone: m.p. 237°.

Anil: m.p. 99°.

p-Toluidine-anil: m.p. 122°.

Braun, Zobel, *Ber.*, 1923, **56**, 2139.

Indene-2-carboxylic Acid



$C_{10}H_8O_2$

MW, 160

Needles or leaflets from C_6H_6 . M.p. 234°. Sol. EtOH, Et₂O. Spar. sol. H₂O, C₆H₆, CHCl₃. Sublimes.

Et ester: $C_{12}H_{12}O_2$. MW, 188. M.p. 50°. $D_4^{25} 1.0549$. $n_D^{25} 1.548$.

Liebermann, Zsuffa, *Ber.*, 1911, **44**, 206.

Auwers, *Ann.*, 1918, **415**, 167.

Indene-3-carboxylic Acid.

Yellow needles. M.p. 161° (156–7°). B.p. about 193–5°/12 mm., 140°/8 mm. Sol. EtOH. Spar. sol. Et₂O, CHCl₃, toluene.

Me ester: $C_{11}H_{10}O_2$. MW, 174. Oil. B.p. 153–4°/23 mm.

Et ester: $C_{12}H_{12}O_2$. MW, 188. Oil. B.p. 164°/24 mm.

Amide: $C_{10}H_9ON$. MW, 159. M.p. 180°.

Nitrile: $C_{10}H_7N$. MW, 141. B.p. 140–2°/13 mm.

Anilide: m.p. 158°.

Hydrazide: m.p. 186°. *Benzylidene deriv.*: m.p. 272–3°. *o-Nitrobenzylidene deriv.*: m.p. 215° decomp.

Phenylhydrazide: m.p. 188°.

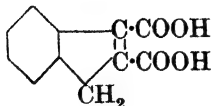
Wislicenus, Henrich, *Ann.*, 1924, **436**, 16.

Grignard, Bellet, Courtot, *Ann. chim.*, 1915, **4**, 55.

Weissgerber, *Ber.*, 1911, **44**, 1440, 2216.

Courtot, *Ann. chim.*, 1915, **4**, 83.

Indene-2 : 3-dicarboxylic Acid



$C_{11}H_8O_4$

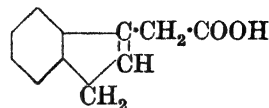
MW, 204

Cryst. M.p. 215° decomp. Sol. EtOH, Me₂CO. Insol. Et₂O, C₆H₆, AcOH.

Di-Et ester: $C_{15}H_{16}O_4$. MW, 280. M.p. 78°.

Bougault, *Compt. rend.*, 1914, **159**, 745.

3-Indenylacetic Acid



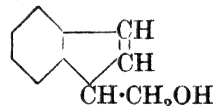
$C_{11}H_{10}O_2$

MW, 174

Nitrile: 3-cyanomethylindene. $C_{11}H_9N$. MW, 155. Needles from pet. ether. M.p. 18°.

Ingold, Thorpe, *J. Chem. Soc.*, 1919, **115**, 152.

1-Indenylcarbinol (*Benzofulvanol*, 1-hydroxymethylindene)



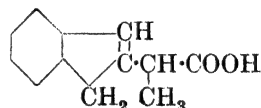
$C_{10}H_{10}O$

MW, 146

Oil with rose odour. B.p. 134–5°/10 mm. Polymerizes on standing.

Courtot, *Ann. chim.*, 1915, **4**, 93; *Compt. rend.*, 1915, **160**, 502.

1-[2-Indenyl]-propionic Acid



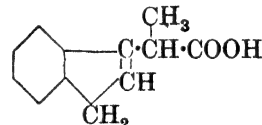
$C_{12}H_{12}O_2$

MW, 188

Nitrile: $C_{12}H_{11}N$. MW, 169. Needles from pet. ether. M.p. 92°.

Ingold, Thorpe, *J. Chem. Soc.*, 1919, **115**, 159.

1-[3-Indenyl]-propionic Acid



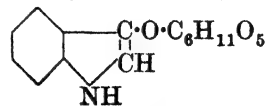
$C_{12}H_{12}O_2$

MW, 188

Nitrile: $C_{12}H_{11}N$. MW, 169. Needles from pet. ether. M.p. 118°.

Ingold, Thorpe, *J. Chem. Soc.*, 1919, **115**, 153.

Indican (*Indoxyl-β-glucoside*)



$C_{14}H_{17}O_6N$

MW, 295

Occurs in *Polygonum tinctorium*, Ait., *Isatis tinctoria*, Linn., and various *Indigofera* species. Needles + 3H₂O from H₂O. M.p. 57–8° (176–8° anhyd.). Hyd. by dil. HCl.

Penta-acetyl deriv.: (i) m.p. 148°; (ii) m.p. 112°.

Tetra-Me ether: $C_{18}H_{25}O_6N$. MW, 351.

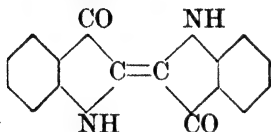
Glassy solid. Softens about 100–10°. $[\alpha]_D^{25} + 9.19^\circ$ in Me_2CO .

Robertson, Waters, *J. Chem. Soc.*, 1933, 30 (*Bibl.*).

Indigo.

See Indigotin and Indigo White.

Indigotin (*Indigo, Indigo Blue*, trans-2 : 2'-di- ψ -indoxyl, di-indogen)



$\text{C}_{16}\text{H}_{10}\text{O}_2\text{N}_2$ MW, 262

Blue powder with coppery lustre. Sublimes. Sol. aniline, PhNO_2 , petroleum. Insol. H_2O , ord. org. solvents. Heat of comb. C_v 1815.2 Cal. Reduced by glucose + NaOH , sodium hydrosulphite, etc. \rightarrow indigo white.

Dioxime: monoacetyl deriv., m.p. 167–8°.

1 : 1'-N-Diacetyl: red cryst. M.p. 200–20°.

1 : 1'-N-Dibenzoyl: violet leaflets. M.p. 254° (257°).

1 : 1'-N-Di-p-nitrobenzoyl: violet cryst. M.p. 290°.

Le Fèvre, Pearson, *J. Chem. Soc.*, 1932, 2807.

Diesbach, Lempen, *Helv. Chim. Acta*, 1933, 16, 148.

Hope, Richter, *J. Chem. Soc.*, 1932, 2783.

Tanasescu, Georgescu, *Bull. soc. chim.*, 1932, 51, 234.

Hinkel, Ayling, Morgan, *J. Chem. Soc.*, 1932, 985.

Spalding, U.S.P., 1,827,828, (*Chem. Abstracts*, 1932, 26, 855).

Wait, U.S.P., 1,786,800, (*Chem. Abstracts*, 1931, 25, 824).

Minaev, Fedorov, *Chem. Abstracts*, 1931, 25, 4129.

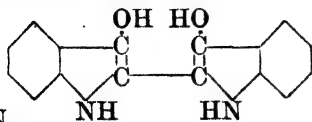
Kattwinkel, Teer, 1927, 25, 585 (*Bibl.*).

Posner, *Ber.*, 1926, 59, 1799.

Nenitzescu, *Ber.*, 1925, 58, 1063.

Martinet, *Chimie et Industrie*, 1925, 13, 531 (*Review*).

Indigo White (*Leuco-indigo*, 2 : 2'-di-indoxyl)



$\text{C}_{16}\text{H}_{12}\text{O}_2\text{N}_2$ MW, 264

Cryst. Sol. EtOH , Et_2O . Oxidises in air to indigotin.

1 : 1' : 3 : 3'-Tetra-acetyl: m.p. 258°.

1 : 1' : 3 : 3'-Tetra-benzoyl: m.p. 242–3°.

1 : 1' : 3 : 3'-Tetra-p-nitrobenzoyl: (i) m.p. 269–70°; (ii) m.p. 281°.

Posner, *Ber.*, 1926, 59, 1815.

I.C.I., E.P., 371,374, (*Chem. Abstracts*, 1933, 27, 3086); U.S.P., 1,861,382, (*Chem. Abstracts*, 1932, 26, 3935).

Indium trimethyl



$\text{C}_3\text{H}_9\text{In}$ MW, 160

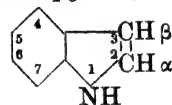
Cryst. M.p. 89–89.8°. Sol. Et_2O . D_{19}^{20} 1.568. Decomp. by H_2O , MeOH , etc. Sublimes.

Dennis, Work, Rochow, Chamot, *J. Am. Chem. Soc.*, 1934, 54, 1047.

Indogenic Acid.

See Indoxylic Acid.

Indole (2 : 3-Benzopyrrole, benzopyrrole)



$\text{C}_8\text{H}_7\text{N}$ MW, 117

Occurs in faeces, coal tar, and in several plants. Leaflets from H_2O . M.p. 52°. B.p. 253–4°. Sol. EtOH , Et_2O , C_6H_6 , hot H_2O . Heat of comb. C_v 1021.8 Cal.

N-Formyl: $\text{C}_9\text{H}_7\text{ON}$. MW, 145. M.p. 52°. B.p. 136–7°/15 mm., 125–6°/8 mm. D_4^{20} 1.750. n_D^{20} 1.6200.

N-Benzoyl: m.p. 67–8°. B.p. 213°/16 mm.

N-Nitroso: m.p. 171–2° decomp.

$\text{B}_2\text{C}_6\text{H}_3(\text{NO}_2)_3$ -1 : 3 : 5: m.p. 187°.

Dimeride: di-indole. $\text{C}_{16}\text{H}_{14}\text{N}_2$. MW, 234. Acetyl deriv.: m.p. 157–8°. N-Mono-nitroso: m.p. 126–8° decomp. (benzoyl deriv.: m.p. 150–1° decomp.). N : N'-Dinitroso: m.p. 160–2° decomp. Phenylisocyanate: m.p. 179–80°.

Trimeride: tri-indole. $\text{C}_{24}\text{H}_{21}\text{N}_3$. MW, 351. M.p. 168°. Phenylisocyanate: m.p. 217°.

Schmitz-Dumont, Hamann, Galler, *Ann.*, 1933, 504, 1; *Ber.*, 1933, 66, 76; *J. prakt. Chem.*, 1932, 132, 39.

Levy, *Ind. Eng. Chem.*, (News Ed.), 1933, 11, 114.

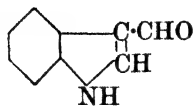
Redgrove, *Perfumery and Essential Oil Record*, 1929, 20, 161 (*Review*).

Neber, Knöller, Herbst, Trissler, *Ann.*, 1929, 471, 113.

Müller, D.R.P., 207,380, (*Chem. Abstracts*, 1919, 13, 1133).

Majima, Unno, Oddo, *Ber.*, 1922, 55, 3854. van der Lee, *Rec. trav. chim.*, 1925, 44, 1089.

Verley, *Bull. soc. chim.*, 1924, 35, 1039. Potokhin, *Chem. Abstracts*, 1928, 22, 3409.

Indole-3-aldehyde (3-Formylindole, 3-aldehydoindole) C_9H_7ON

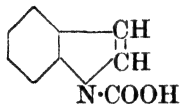
MW, 145

M.p. 194°.

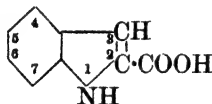
N-Acetyl: m.p. 159–62°.

Oxime: m.p. 197–8°.

Anil: decomp. at 240–6°.

B, HNO_3 : decomp. at 94°.Majima, Kotake, *Ber.*, 1930, **63**, 2237.Potokhin, *Chem. Abstracts*, 1928, **22**, 3409.**Indole-N-carboxylic Acid** (Indole-1-carboxylic acid) $C_9H_7O_2N$

MW, 161

Yellow cryst. M.p. 108° decomp. Hot H_2O → indole. NH_3 → indole + $(NH_4)_2CO_3$.Oddo, Sessa, *Gazz. chim. ital.*, 1911, **41**, i, 234.**Indole-2-carboxylic Acid** (Indole- α -carboxylic acid) $C_9H_7O_2N$

MW, 161

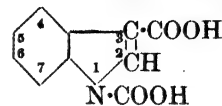
M.p. 203° (201–2° decomp.).

Et ester: $C_{11}H_{11}O_2N$. MW, 189. M.p. 125–6°.N-Me: $C_{10}H_9O_2N$. MW, 175. Needles from EtOH. M.p. 212°. Sol. hot EtOH, Et_2O , C_6H_6 . Insol. cold H_2O .Gabriel, Gerhard, Wolter, *Ber.*, 1923, **56**, 1027.Maurer, Moser, *Z. physiol. Chem.*, 1926, **161**, 135.Gränacher, Mahal, Gerö, *Helv. Chim. Acta*, 1924, **7**, 579.Giua, *Gazz. chim. ital.*, 1924, **54**, 593.Fischer, Hess, *Ber.*, 1884, **17**, 561.**Indole-3-carboxylic Acid** (Indole- β -carboxylic acid).

M.p. 210–18°.

Nitrile: $C_9H_6N_2$. MW, 142. Rose-coloured cryst. M.p. 178°. N-Acetyl: m.p. 202°.Gavrilow, *Chem. Abstracts*, 1925, **19**, 505.Majima, Shigematsu, *Ber.*, 1924, **57**, 1452.Mingoa, *Gazz. chim. ital.*, 1932, **62**, 844.**Indole-6-carboxylic Acid.**

Needles from AcOH. M.p. 243–4°.

Nitrile: $C_9H_6N_2$. MW, 142. M.p. 129–30°.Kermack, *J. Chem. Soc.*, 1924, **125**, 2290.**Indole-1 : 3-dicarboxylic Acid** $C_{10}H_7O_4N$

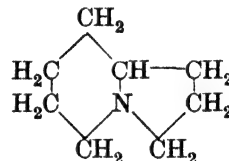
MW, 205

Di-Et ester: $C_{14}H_{15}O_4N$. MW, 261. Cryst. from EtOH. M.p. 102–3°.Majima, Kotake, *Ber.*, 1930, **63**, 2239.**Indole-2 : 6-dicarboxylic Acid.**

Needles from AcOH. M.p. above 310°.

Di-Et ester: $C_{14}H_{15}O_4N$. MW, 261. Yellow needles from AcOH. M.p. 132°.6-Nitrile: $C_{10}H_6O_2N_2$. MW, 186. M.p. 290–5° decomp. 2-Et ester: $C_{12}H_{10}O_2N_2$. MW, 214. M.p. 171°.Kermack, *J. Chem. Soc.*, 1924, **125**, 2288.**Indoline.**

See Dihydroindole.

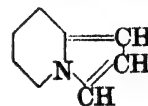
Indolizidine (Octahydropyrrocoline, octahydro-pyrindole) $C_8H_{15}N$

MW, 125

B.p. 75°/43 mm., 65–7°/18 mm. Sol. EtOH, Et_2O . Spar. sol. H_2O . D_4^{20} 0.9074. n_D 1.4748.B, HBr : plates from AcOEt. M.p. 196°.B, H_2PtCl_6 : m.p. 215° decomp.B, $HAuCl_4$: m.p. 200° decomp.B, $HgCl_2$: m.p. 237° decomp.

Picrate: (i) needles from EtOH. M.p. 135–6°.

(ii) M.p. 226° decomp. (228.5°).

Ochiai, Tsuda, *Ber.*, 1934, **67**, 1013.Clemon, Ramage, *J. Chem. Soc.*, 1932, 2969.**Indolizine** (Pyrrocoline, pyrindole) C_8H_7N

MW, 117

Plates. M.p. 75°. B.p. 205°/760 mm. Volatile in steam. Decomp. by acids.

Picrate: m.p. 101°.

Diels, Alder, *Ann.*, 1932, **498**, 44.

Scholtz, *Ber.*, 1912, **45**, 1724.

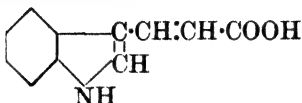
Indolol.

See Hydroxyindole.

3-Indolylacetic Acid.

See Heteroauxine.

2-[3-Indolyl]-acrylic Acid



$C_{11}H_9O_2N$

MW, 187

Reddish-brown plates from hot H_2O . M.p. 195-6°. Sol. EtOH, Et_2O , hot H_2O . Insol. pet. ether.

Bauguess, Berg, *J. Biol. Chem.*, 1934, **104**, 676.

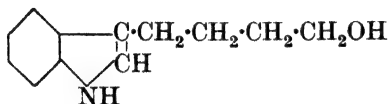
2-[3-Indolyl]- α -alanine.

See Tryptophane.

Indolylamine.

See Aminoindole.

4-[3-Indolyl]-*n*-butyl Alcohol (3- ω -Hydroxybutylindole)



$C_{12}H_{15}ON$

MW, 189

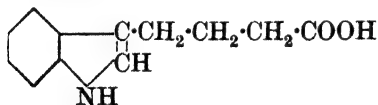
M.p. 32-3°.

Picrate: m.p. 102°.

Phenylurethane: m.p. 88°.

Jackson, Manske, *J. Am. Chem. Soc.*, 1930, **52**, 5034.

3-[3-Indolyl]-*n*-butyric Acid



$C_{12}H_{13}O_2N$

MW, 203

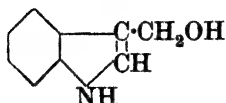
Plates from C_6H_6 -pet. ether. M.p. 124°.

Me ester: $C_{13}H_{15}O_2N$. MW, 217. M.p. 73-4°. B.p. 230°/6 mm.

Hydrazide: m.p. 112°.

Jackson, Manske, *J. Am. Chem. Soc.*, 1930, **52**, 5032.

3-Indolylcarbinol (3-Hydroxymethylindole)



C_9H_9ON

MW, 147

M.p. 158°.

O : N-*Diacetyl*: m.p. 95°.

Mingoia, *Gazz. chim. ital.*, 1932, **62**, 844.

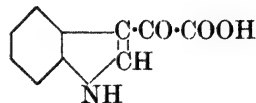
2-[3-Indolyl]-ethyl Alcohol.

See Tryptophol.

Indolylethylamine.

See Aminoethyl-indole.

3-Indolylglyoxylic Acid



$C_{10}H_7O_3N$

MW, 189

Yellow cryst. M.p. 215° decomp.

Et ester: $C_{12}H_{11}O_3N$. MW, 217. M.p. 186°.

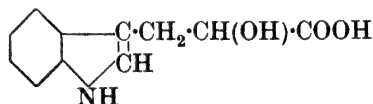
Chloride: $C_{10}H_6O_2NCl$. MW, 207.5. M.p. 138-9°.

Amide: $C_{10}H_8O_2N_2$. MW, 188. M.p. 248°.

Majima, Shigematsu, *Ber.*, 1924, **57**, 1451.

Oddo, Albanese, *Gazz. chim. ital.*, 1927, **57**, 827.

2-[3-Indolyl]-lactic Acid



$C_{11}H_{11}O_3N$

MW, 205

l-.

Needles from Et_2O -pet. ether. M.p. 100-101° (99%). $[\alpha]_D^{20} - 5.36^\circ$ in H_2O .

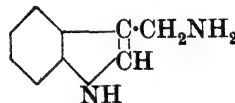
dl-.

M.p. 144-5°.

Ehrlich, Jacobsen, *Ber.*, 1911, **44**, 896.

Bauguess, Berg, *J. Biol. Chem.*, 1934, **104**, 679.

3-Indolylmethylamine (3- ω -Aminomethylindole)



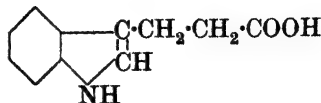
$C_9H_{10}N_2$

MW, 146

M.p. 84°.

Putokhin, *Ber.*, 1926, **59**, 1997.

2-[3-Indolyl]-propionic Acid



$C_{11}H_{11}O_2N$

MW, 189

M.p. 134° (132–3°).

Meester: $C_{12}H_{13}O_2N$. MW, 203. M.p. 79–80°.

Nitrile: $C_{11}H_{10}N_2$. MW, 170. M.p. 67–8°.

Picrate: m.p. 123.5–124.5°.

Hydrazide: m.p. 129–30°.

Picrate: m.p. 141–3°.

Majima, Hoshino, *Ber.*, 1925, **58**, 2045.

Kalb, Schweizer, Schimpf, *Ber.*, 1926, **59**, 1858.

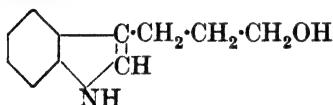
Maurer, Moser, *Z. physiol. Chem.*, 1926, **161**, 140.

Keimatsu, Sugawara, *Chem. Abstracts*, 1929, **23**, 834.

Bauguess, Berg., *J. Biol. Chem.*, 1934, **104**, 678.

Manske, Robinson, *J. Chem. Soc.*, 1927, 241.

3-[3-Indolyl]-propyl Alcohol (3- ω -Hydroxypropylindole)



$C_{11}H_{13}ON$

MW, 175

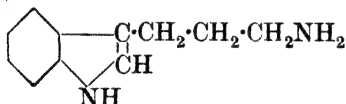
Oil. F.p. 0°.

Picrate: m.p. 101°.

Phenylurethane: m.p. 94°.

Jackson, Manske, *J. Am. Chem. Soc.*, 1930, **52**, 5034.

3-[3-Indolyl]-propylamine (3- ω -Aminopropylindole)



$C_{11}H_{14}N_2$

MW, 174

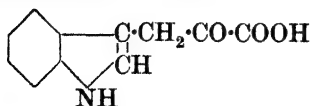
M.p. 60–4°. Hygroscopic.

B, HCl : m.p. 170°.

Picrate: m.p. 146–9° (155–6° anhyd.).

Jackson, Manske, *J. Am. Chem. Soc.*, 1930, **52**, 5033.

3-Indolylpyruvic Acid



$C_{11}H_9O_3N$

MW, 203

Grey cryst. + $1CH_3 \cdot COOH$ from AcOH. M.p. 211°.

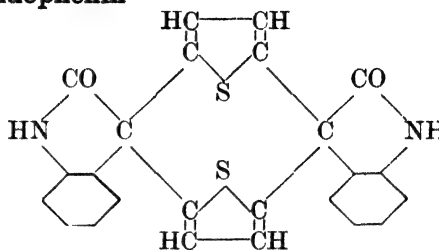
Oxime: m.p. about 175°.

p-Nitrophenylhydrazone: m.p. 153–4°.

Bauguess, Berg, *J. Biol. Chem.*, 1934, **104**, 679.

Gränacher, Gerö, Schelling, *Helv. Chim. Acta*, 1924, **7**, 577.

Indophenin



$C_{24}H_{14}O_2N_2S_2$

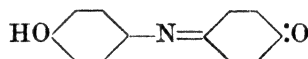
MW, 426

Blue needles with coppery lustre from PhOH-EtOH. Decomp. on heating. Spar. sol. EtOH, Et_2O , $CHCl_3$, AcOH. $Zn + AcOH \rightarrow$ colourless sol. which re-oxidises in air to indophenin.

Heller, *Chem.-Ztg.*, 1933, **57**, 74.

Steinkopf, Roch, *Ann.*, 1930, **482**, 251 (Bibl.).

Indophenol



$C_{12}H_9O_2N$

MW, 199

Plates from Me_2CO -pet. ether. M.p. 160°. Sol. H_2O , EtOH, Et_2O , $CHCl_3$, C_6H_6 .

B, HCl : m.p. 310°.

Acetyl: needles from pet. ether. M.p. 115–16°.

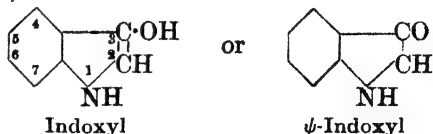
Kehrmann, Decker, Schmajewski, *Ber.*, 1921, **54**, 2437.

Heller, *Ann.*, 1912, **392**, 26.

Meyer, Elbers, *Ber.*, 1921, **54**, 342.

A.G.F.A., D.R.P., 157,288, (*Chem. Zentr.*, 1905, I, 315).

Indoxyl (3-Hydroxyindole, 3-ketodihydroindole)



Indoxyl

ψ-Indoxyl

Occurs in human and animal urine. Oil. Ox. \rightarrow indigotin.

N-Acetyl: m.p. 139°. Oxime hydrochloride: m.p. 139°. Phenylhydrazone: m.p. 154°.

3-Acetyl: m.p. 127.5°.

1:3-Diacetyl: m.p. 82°.

N-Nitroso: *Et ether*, $C_{10}H_{10}O_2N_2$. MW, 190. M.p. 84–5°.

Glucoside: see Indican.

Spencer, *J. Soc. Chem. Ind.*, 1931, **50**, 64r.

Wait, U.S.P., 1,820,684, (*Chem. Abstracts*, 1931, **25**, 5678).

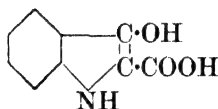
Dow, U.S.P., 1,564,218, (*Chem. Abstracts*, 1926, **20**, 423).

Feuchter, *Chem.-Ztg.*, 1914, **38**, 273.

ψ-Indoxyl.

See Indoxyl.

Indoxylic Acid (3-Hydroxyindole-2-carboxylic acid, indogenic acid)



$C_9H_7O_3N$

MW, 177

Cryst. Sublimes with decomp. at 122–3°. Spar. sol. H_2O . Ox. \rightarrow indigotin. Heat \rightarrow indoxyl.

Me ester: $C_{10}H_9O_3N$. MW, 191. Needles from MeOH. M.p. 157–8°. **3-Acetyl**: m.p. 145°. **3-Tetra-acetyl-β-glucoside**: m.p. 229–30°.

Et ester: $C_{11}H_{11}O_3N$. MW, 205. M.p. 116–17° (120–1°).

3-Et ether: $C_{11}H_{11}O_3N$. MW, 205. M.p. 160°.

Et ester: $C_{13}H_{15}O_3N$. MW, 233. M.p. 98°.

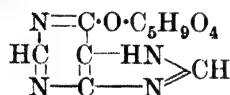
N-Acetyl: purple, yellow, or green cryst. Turns blue at 150°. M.p. 179° decomp.

Robertson, *J. Chem. Soc.*, 1927, 1939.

Spencer, *J. Soc. Chem. Ind.*, 1931, **50**, 63r.

Ruggli, Bolliger, *Helv. Chim. Acta*, 1921, **4**, 643.

Inosin (*Hypoxanthine thyminoside*)



$C_{10}H_{12}O_5N_4$

MW, 268

Cryst. + $2H_2O$. M.p. 215°. Hyd. \rightarrow hypoxanthine + thymine.

Triacetyl deriv.: m.p. 236°.

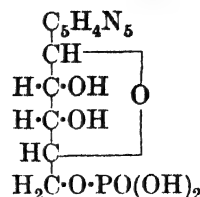
Triphenylmethyl ether: $C_{29}H_{26}O_5N_4$. MW, 510. M.p. 253–4°.

Haiser, Wenzel, *Chem. Zentr.*, 1908, **II**, 235.

Bielschowsky, Klein, *Z. physiol. Chem.*, 1932, **207**, 202; **210**, 134.

Bredereck, *Ber.*, 1933, **66**, 198.

Inosinic Acid (*Inosic acid*)



$C_{10}H_{14}O_7N_5P$

MW, 347

Occurs in muscle. Syrup. Sol. H_2O . Spar. sol. EtOH. Insol. Et₂O.

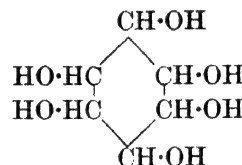
Klimek, Parnas, *Biochem. Z.*, 1932, **252**, 392.

Kiessling, *Biochem. Z.*, 1934, **273**, 103.

Ostern, *Biochem. Z.*, 1932, **254**, 65.

Embsen, *Z. physiol. Chem.*, 1932, **210**, 194.

Inositol (*Cyclohexane-hexol, hexahydroxycyclohexane*)



$C_6H_{12}O_6$

MW, 180

d-. Matezodambose.

Occurs in *Pinus Lambertiana*, Dougl., and *Ceratonia Siliqua*, Linn. M.p. 247–8° (235°). Sol. H_2O . Spar. sol. EtOH. Insol. Et₂O. $[\alpha]_D^{20} + 68^\circ$.

Mono-Me ether: methylinositol, pinitol, pinite, sennite, matezite. $C_7H_{14}O_6$. MW, 194. Occurs in Madagascar rubber latex. Prisms from MeOH. M.p. 186°. **Penta-acetyl**: m.p. 98°. $[\alpha]_D^{20} - 9.67^\circ$. **Penta-benzoyl**: m.p. 97°. $[\alpha]_D^{20} + 32.3^\circ$.

l-.

Needles + $2H_2O$ from H_2O . M.p. 247° (236–8°). Spar. sol. EtOH. Insol. Et₂O. $[\alpha]_D^{20} - 64.1^\circ$ in H_2O . $D^{20} 1.598$.

Mono-Me ether: methylinositol, quebrachitol, bornesitol, bornesite. Occurs in Hevea and Borneo rubber latex. $C_7H_{14}O_6$. MW, 194. M.p. 191°. Mod. sol. hot EtOH. Insol. Et₂O. $[\alpha]_D^{20} - 80.3^\circ$ in H_2O . $D^0 1.54$.

dl-.

Occurs in tobacco, blackberry, etc. M.p. 253° (220°/225°).

Hexa-acetyl: m.p. 111°.

Hexa-carbethoxyl: m.p. 131–5°.

Meso-. Dambose, nucitol.

Occurs in various plants. Cryst. from EtOH.Aq. M.p. 218–19°.

Me ether: $C_7H_{14}O_6$. MW, 194. M.p. 204° .
Penta-acetyl: m.p. 96° (141° anhyd.).

Di-Me ether: dambonite. $C_8H_{16}O_6$. MW, 208. M.p. 206° . *Tetra-acetyl*: m.p. 223° (195°).

Hexa-acetyl: (i) m.p. 200° . (ii) M.p. 216° . B.p. $234^\circ/2.5$ mm.

Hexa-benzoyl: m.p. 258° .

Hexa-m-nitrobenzoyl: m.p. 217° .

Bruni, E.P., 216,982, (*Chem. Abstracts*, 1925, 19, 300).

Whitby, Dolid, Yorston, *J. Chem. Soc.*, 1926, 1451.

Lindenfeld, *Biochem. Z.*, 1934, 272, 284.

Philipson, *Z. physiol. Chem.*, 1930, 193, 15.

Moldawski, *Chem. Zentr.*, 1926, I, 640.

Boeseken, Julius, *Rec. trav. chim.*, 1926, 45, 489.

Müller, *J. Chem. Soc.*, 1912, 101, 2383.

Posternak, *Helv. Chim. Acta*, 1929, 12, 1165.

Girard, *Compt. rend.*, 1873, 77, 995.

Griffin, Nelson, *J. Am. Chem. Soc.*, 1915, 37, 1552.

Sherrard, Kurth, *Ind. Eng. Chem.*, 1928, 20, 722.

Rhodes, Wiltshire, *Chem. Abstracts*, 1932, 26, 4502.

Insulin.

Antidiabetic present in the pancreas (Islets of Langerhans). Cryst. M.p. 233° after turning brown at 215° . Lævorotatory. Chemical properties are those of a typical protein. Isoelectric point, p_H 5.3–5.35.

Jensen, Evans, *Physiological Reviews*, 1934, 14, 188.

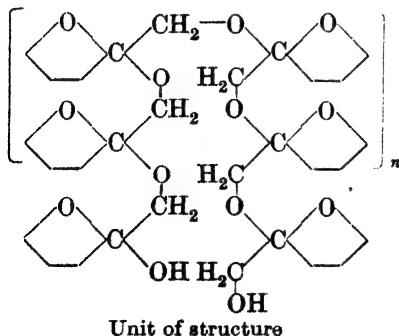
Jensen, *Science*, 1932, 75, 614.

Abel, *Proceedings of the National Academy of Sciences*, 1926, 12, 132.

Intramaine.

See 2 : 2'-Diaminodiphenyl disulphide.

Inulin



Polysaccharide from various plants. MW, about 500. $[\alpha]_D^{21} - 38.3^\circ$. Hyd. \rightarrow fructose.

Tri-Me ether: m.p. 140° . $[\alpha]_D^{20} - 55^\circ$ in $CHCl_3$.

Triacetyl deriv.: m.p. $150-60^\circ$. $[\alpha]_D^{20} - 45.5^\circ$ in AcOH.

Hexa-acetyl deriv.: m.p. 135° . $[\alpha]_D^{20} - 39.5^\circ$ in AcOH.

Tripalmityl deriv.: m.p. 52.5° .

Tristearyl deriv.: m.p. 60.3° .

Haworth, Hirst, Percival, *J. Chem. Soc.*, 1932, 2384.

Hagenbuch, *Helv. Chim. Acta*, 1932, 15, 616.

Bergmann, Knehe, *Ann.*, 1926, 449, 302.

Arsem, U.S.Ps., 1,616,164, 1,616,167, (*Chem. Abstracts*, 1927, 21, 1026).

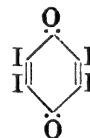
Karrer, *Z. angew. Chem.*, 1922, 35, 89 (*Bibl. Review*).

Ohlmeyer, Pringsheim, *Ber.*, 1933, 66, 1292.

Irvine, Montgomery, *J. Am. Chem. Soc.*, 1933, 55, 1988.

Berner, *Ber.*, 1933, 66, 397.

Iodanil (Tetra-iodobenzoquinone)



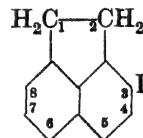
$C_6O_2I_4$

MW, 612

Brown needles from AcOH. M.p. $282-4^\circ$ decomp. (265° decomp.). Mod. sol. hot AcOEt. Spar. sol. C_6H_6 , AcOH, Me_2CO . Insol. EtOH, Et_2O .

Jackson, Bolton, *J. Am. Chem. Soc.*, 1914, 36, 305.

3-Iodoacenaphthene



$C_{12}H_9I$

MW, 280

Yellow needles from EtOH. M.p. $88-90^\circ$. Sol. ord. org. solvents.

Morgan, Harrison, *J. Soc. Chem. Ind.*, 1930, 49, 418t.

5-Iodoacenaphthene.

Needles from EtOH. F.p. 62° . M.p. 65° ($63-63.5^\circ$). $D_4^{25} 1.6738$. $n_D^{25} 1.6909$.

Picrate: m.p. 102.5°.

Sachs, Mosebach, *Ber.*, 1910, **43**, 2475.

Crompton, Walker, *J. Chem. Soc.*, 1912, **101**, 963.

Iodoacetal.

See under Iodoacetaldehyde.

Iodoacetaldehyde



$\text{C}_2\text{H}_3\text{OI}$ MW, 170

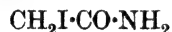
Liq. at -20°. Decomp. at 80°. Sol. EtOH, Et₂O, CHCl₃, CS₂. Insol. H₂O. D₂₀ 2.14. KOH → CHI₃.

Di-Et acetal: iodoacetal. C₆H₁₃O₂I. MW, 244. B.p. 132°/90 mm., 115°/50 mm., 100°/10 mm. (82°/13 mm.).

Dawson, Marshall, *J. Chem. Soc.*, 1914, **105**, 388.

Losanitsch, *Ber.*, 1909, **42**, 4046.

Iodoacetamide



$\text{C}_2\text{H}_4\text{ONI}$ MW, 185

Cryst. from H₂O. M.p. 95°.

Braun, *Ber.*, 1908, **41**, 2144.

Jacobs, Heidelberger, *J. Am. Chem. Soc.*, 1919, **41**, 2093.

N-Iodoacetamide (Acetiodoamide)



$\text{C}_2\text{H}_4\text{ONI}$ MW, 185

M.p. about 143° decomp. Sol. EtOH, AcOEt, Me₂CO. Spar. sol. Et₂O. Insol. C₆H₆, CHCl₃, ligroin.

Boismenu, *Compt. rend.*, 1911, **153**, 949.

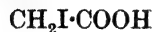
Iodoacetanilide.

See under Iodoacetic Acid and Iodoaniline.

Iodo-acetanisidide.

See under Iodoaminophenol.

Iodoacetic Acid



$\text{C}_2\text{H}_3\text{O}_2\text{I}$ MW, 186

Plates from pet. ether. M.p. 83° (82°).

Me ester: C₃H₅O₂I. MW, 200. B.p. 169-71°.

Et ester: C₄H₇O₂I. MW, 214. Oil. B.p. 178-80°, 142.5-143.5°/250 mm., 85-6°/25 mm., 73°/16 mm. D₄¹⁷ 1.8173. n_D¹⁷ 1.50789.

Propyl ester: C₅H₉O₂I. MW, 228. B.p. 198°.

Catechol ester: C₁₀H₈O₄I₂. MW, 446. M.p. 48-9°.

Resorcinol ester: m.p. 59-60°.

Hydroquinone ester: m.p. 112-13°.

Amide: see Iodoacetamide.

Chloride: C₂H₂OCIL. MW, 204.5. Oil. B.p. 49-52°/15 mm. D₂₅ 2.25.

Anhydride: C₄H₄O₃I₂. MW, 354. M.p. 46°.

Nitrile: C₂H₂NI. MW, 167. Oil. B.p. 182-4° decomp./720 mm., 76-7°/12 mm.

Anilide: iodoacetanilide. M.p. 143-4°.

Braun, *Ber.*, 1908, **41**, 2134.

Abderhalden, Guggenheim, *Ber.*, 1908, **41**, 2853.

Lukner, *Chem. Abstracts*, 1931, **25**, 1814.

Heritage, *Chem. Abstracts*, 1919, **13**, 3288.

Knoll, D.R.P., 230,172, (*Chem. Zentr.*, 1911, I, 359).

1-Iodoacetoacetic Acid



$\text{C}_4\text{H}_5\text{O}_3\text{I}$ MW, 228

Et ester: iodoacetoacetic ester. C₆H₉O₃I. MW, 256. Liq. Decomp. on dist. in vacuo. D₁₄ 1.7053. Sol. Et₂O. FeCl₃ → bluish-red col.

Brühl, *Ber.*, 1903, **36**, 1731.

Iodoacetone



$\text{C}_3\text{H}_5\text{OI}$ MW, 184

Yellow liq. B.p. 58.4°/11 mm. D₁₅ 2.17.

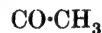
Oxime: m.p. 64.5°.

Scholl, Matthaiopoulos, *Ber.*, 1896, **29**, 1557.

ω-Iodoacetophenone.

See Phenacyl iodide.

o-Iodoacetophenone



$\text{C}_8\text{H}_7\text{OI}$ MW, 246

Yellow oil. B.p. 139-40°/12 mm. D₄²⁰ 1.746.

Oxime: m.p. 130-2°.

Auwers, Lechner, Bundesmann, *Ber.*, 1925, **58**, 50.

p-Iodoacetophenone.

Plates from Et₂O. M.p. 85°. B.p. 153°/18 mm. Sol. EtOH, C₆H₆, AcOH, CS₂. Spar. sol. Et₂O, ligroin.

Kimura, *Ber.*, 1934, **67**, 395.

Iodoacetphenetide.

See 2-Iodophenacetin.

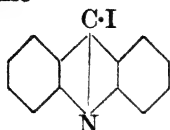
Iodoacetylene



C_2HI

MW, 152

B.p. 32°.

Grignard, Tehéoufaki, *Compt. rend.*, 1929, 188, 357.**5-Iodoacridine** $C_{13}H_8NI$

MW, 305

Brownish-yellow needles. M.p. 171° (169°). Sol. $CHCl_3$. Mod. sol. EtOH.

Picrate: m.p. 204°.

Edinger, *Ber.*, 1900, 33, 3770.Kalle, D.R.P., 126,795, (*Chem. Zentr.*, 1902, I, 80).**1-Iodoacrolein** C_2H_3OI

MW, 170

Reddish coloured, unstable liq. B.p. 37°/8-9 mm. Lachrymatory.

Berlande, *Bull. soc. chim.*, 1925, 37, 1393.**Iodo- α -aminobenzoic Acid.**

See Iodoanthranilic Acid.

2-Iodo- m -aminobenzoic Acid $C_7H_5O_2NI$

MW, 263

B.HCl: m.p. 262-3°.

N-Acetyl: m.p. 199°.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 454.Christie, James, Kenner, *J. Chem. Soc.*, 1923, 123, 1949.**5-Iodo- m -aminobenzoic Acid.**

Cryst. from EtOH.Aq. M.p. 197°. Sol. AcOH.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 504.**2-Iodo- p -aminobenzoic Acid** $C_7H_5O_2NI$

MW, 263

Needles from EtOH.Aq. Decomp. at 180° (m.p. 188° decomp.). Sol. EtOH, Et_2O , $CHCl_3$, hot H_2O .

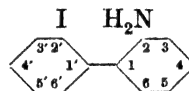
B.HCl: decomp. above 210°.

Me ester: $C_8H_8O_2NI$. MW, 277. M.p. 112°.

N-Acetyl: m.p. 213-14°.

Wheeler, Johns, *Am. Chem. J.*, 1910, 44, 446.Brenans, Prost, *Compt. rend.*, 1924, 178, 1555.**3-Iodo- p -aminobenzoic Acid.**

Yellow prisms. M.p. 201-2°.

N-Acetyl: needles from H_2O . M.p. 230°.N-Di-Me: $C_9H_{10}O_2NI$. MW, 291. Needles from EtOH. M.p. 190-1° decomp.Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 454.Reverdin, *Ber.*, 1907, 40, 3689.**2'-Iodo-2-aminodiphenyl** $C_{12}H_{10}NI$

MW, 295

Prisms. M.p. 129-30°.

Mascarelli, Gatti, *Atti accad. Lincei*, 1931, 13, 891, (*Chem. Abstracts*, 1932, 26, 1272).**4'-Iodo-4-aminodiphenyl (4'-Iodoxenyl-amine).**

Yellow leaflets from EtOH. M.p. 166-7° (159°).

B.HCl: m.p. 295° decomp.

N-Benzylidene: m.p. 208.5-209.5°.

N- p -Dimethylaminobenzylidene: m.p. 204°.

N-Piperonylidene: m.p. 150-1°.

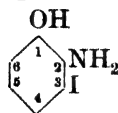
Guglielmelli, Franco, *Chem. Abstracts*, 1932, 26, 4327.Kawai, *Chem. Zentr.*, 1930, II, 1969.**4-Iodo- α -aminohydrocinnamic Acid (4-Iodophenyl- α -alanine)** $C_9H_9O_2NI$

MW, 291

Thin scales from AcOH. M.p. 276° (270°) decomp. Spar. sol. EtOH. Very spar. sol. hot H_2O .

Hydrochloride: plates. Decomp. at 248°.

Et ester: $C_{11}H_{14}O_2NI$. MW, 319. Oil. B.p. 223-6°/25 mm. Picrate: m.p. 200-203°.Wheeler, Clapp, *Am. Chem. J.*, 1908, 40, 463.Abderhalden, Brossa, *Ber.*, 1909, 42, 3414.

3-Iodo-*o*-aminophenol C_6H_6ONI

MW, 235

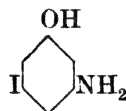
Needles. M.p. 137° decomp.

Hodgson, Kershaw, *J. Chem. Soc.*, 1928, 2704.**4-Iodo-*o*-aminophenol.**

Needles. M.p. 139°.

Me ether: 4-iodo-*o*-anisidine. C_7H_8ONI . MW, 249. M.p. 87°.Robinson, *J. Chem. Soc.*, 1916, 109, 1084.
Hunter, Barnes, *J. Chem. Soc.*, 1928, 2057.**5-Iodo-*o*-aminophenol.**

Needles. M.p. 141°.

Me ether: 5-iodo-*o*-anisidine. C_7H_8ONI . MW, 249. *N-Acetyl*: 5-iodo-*o*-acetanisidide. M.p. 175-6°.Hodgson, Kershaw, *J. Chem. Soc.*, 1928, 2705.**6-Iodo-*o*-aminophenol.***Me ether*: 6-iodo-*o*-anisidine. C_7H_8ONI . MW, 249. Cryst. from EtOH.Aq. M.p. 49°. *N-Acetyl*: 6-iodo-*o*-acetanisidide. M.p. 176°.Dains, Magers, *J. Am. Chem. Soc.*, 1930, 52, 1573.**5-Iodo-*m*-aminophenol** C_6H_6ONI

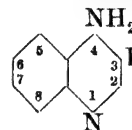
MW, 235

Me ether: 5-iodo-*m*-anisidine. C_7H_8ONI . MW, 249. M.p. 86.5°.Hodgson, Wignall, *J. Chem. Soc.*, 1926, 2078.**2-Iodo-*p*-aminophenol** C_6H_6ONI

MW, 235

Me ether: 2-iodo-*p*-anisidine. C_7H_8ONI . MW, 249. Needles from H_2O . M.p. 74-5°. Volatile in steam. *Picrate*: decomp. at 207°. *N-Acetyl*: 2-iodo-*p*-acetanisidide. M.p. 152-3°.*Et ether*: 2-iodo-*p*-phenetidine. $C_8H_{10}ONI$. MW, 263. *Picrate*: decomp. at 180°. *N-Acetyl*: see 2-Iodophenacetin.Reverdin, *Ber.*, 1896, 29, 998.**3-Iodo-*p*-aminophenol.**

Plates. M.p. 145-5°.

Hodgson, Kershaw, *J. Chem. Soc.*, 1928, 2704.**3-Iodo-4-aminoquinoline** $C_9H_7N_2I$

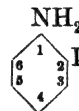
MW, 270

Needles from hot H_2O . M.p. 197°.Claus, Frobenius, *J. prakt. Chem.*, 1897, 56, 193.**6-Iodo-5-aminoquinoline.**

Yellow needles from EtOH. M.p. 176°.

N-Acetyl: m.p. 197°.Howitz, Fraenkel, Schroeder, *Ann.*, 1913, 396, 73.**8-Iodo-5-aminoquinoline.**Brown needles + $1H_2O$. from EtOH.Aq., m.p. 148°; prisms from C_6H_6 , m.p. 155°. *N-Benzoyl*: m.p. 218°.Howitz, Fraenkel, Schroeder, *Ann.*, 1913, 396, 60.**5-Iodo-8-aminoquinoline.**

Yellowish-brown needles from EtOH.Aq. M.p. 122°.

N-Benzoyl: m.p. 161°.Howitz, Fraenkel, Schroeder, *Ann.*, 1913, 396, 70.***o*-Iodoaniline** C_6H_6NI

MW, 219

Needles. M.p. 60-1° (56.5°). Sol. ord. org. solvents. Spar. sol. H_2O . Volatile in steam.*B.HCl*: m.p. 153-4°.*N-Acetyl*: *o*-iodoacetanilide. C_8H_8ONI . MW, 261. M.p. 109-10°.Baeyer, *Ber.*, 1905, 38, 2760.Ries, *Zeitschrift für Kristallographie*, 1923, 58, 340.

m-Iodoaniline.

Leaflets. M.p. 33° (25°). B.p. 145–6°/15 mm.

B.HCl: m.p. 260°.

N-Acetyl: m-iodoacetanilide. M.p. 119.5°.

N-Chloroacetyl: m.p. 121.5–122.5°.

N-Benzoyl: m-iodobenzanilide. $C_{13}H_{10}ONI$. MW, 323. M.p. 156–7°.

N-p-Toluenesulphonyl: m.p. 128°.

McCombie, Ward, *J. Chem. Soc.*, 1913, 103, 1999.

Körner, Wender, *Gazz. chim. ital.*, 1887, 17, 489.

p-Iodoaniline.

M.p. 67–8° (62°). Sol. EtOH. Mod. sol. Et₂O. Spar. sol. pet. ether. Volatile in steam.

N-Formyl: p-iodoformanilide. C_7H_6ONI . MW, 247. M.p. 08–9°.

N-Acetyl: p-iodoacetanilide. M.p. 184°.

N-Chloroacetyl: m.p. 191–4°.

N-Diacetyl: m.p. 108–5°.

N-N'-Malonyl: m.p. 267°.

N-Benzoyl: p-iodobenzanilide. M.p. 222°.

N-p-Iodobenzoyl: m.p. 287°.

N-o-Nitrobenzoyl: m.p. 208°.

N-m-Nitrobenzoyl: m.p. 202°.

N-p-Nitrobenzoyl: m.p. 269°.

N-Cinnamoyl: m.p. 204°.

N-Phenylacetyl: m.p. 200°.

N-Benzylidene: m.p. 85–5°.

N-Anisylidene: m.p. 151°.

Brewster, *Organic Syntheses*, 1931, XI, 62 (Bibl.).

2-Iodoanisaldehyde

$C_8H_7O_2I$ MW, 262

Colourless needles from EtOH. M.p. 115°. Volatile in steam.

Oxime: m.p. 101°.

Semicarbazone: m.p. 211°.

p-Nitrophenylhydrazone: m.p. 247° decomp.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3043.

3-Iodoanisaldehyde.

Prisms or plates from Et₂O. M.p. 107°. Very sol. EtOH. Sol. C₆H₆. Mod. sol. Et₂O. Spar. sol. ligroin.

Oxime: m.p. 130°.

Phenylhydrazone: cryst. from EtOH. M.p. 106.5–107°.

Seidel, *J. prakt. Chem.*, 1899, 59, 141; 1898, 57, 206.

2-Iodoanistic Acid

$C_8H_7O_3I$

MW, 278

M.p. 184°.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3044.

3-Iodoanistic Acid.

Needles from EtOH. M.p. 234.5°. Sublimes in leaflets. Sol. 165 parts cold Et₂O. Very spar. sol. hot H₂O.

Me ester: $C_9H_9O_3I$. MW, 292. Cryst. from pet. ether. M.p. 94–5°.

Et ester: $C_{10}H_{11}O_3I$. MW, 306. Cryst. from pet. ether. M.p. 64.75–65.75°.

Willgerodt, Burkhard, *Ann.*, 1912, 389, 294.

Seidl, *J. prakt. Chem.*, 1899, 59, 147.

Iodoanisidine.

See under Iodoaminophenol.

o-Iodoanisole

C_7H_7OI

MW, 234

Oil. B.p. 239–40°/730 mm. (238°). Sol. EtOH, Et₂O, AcOH, CHCl₃, C₆H₆, ligroin. D₂₀ 1.8.

Jannasch, Hinterskirch, *Ber.*, 1898, 31, 1710.

Reverdin, *Ber.*, 1896, 29, 997.

m-Iodoanisole.

Oil. B.p. 244–5°, 123°/14 mm., 110–110.5°/11 mm. Sol. EtOH, Et₂O.

Buchan, McCombie, *J. Chem. Soc.*, 1932, 2859.

p-Iodoanisole.

Needles from MeOH.Aq. M.p. 51–2°. B.p. 237°/726 mm.

Matheson, McCombie, *J. Chem. Soc.*, 1931, 1106.

Blicke, Smith, *J. Am. Chem. Soc.*, 1928, 50, 1229.

3-Iodoanthranilic Acid.

 $C_7H_6O_2NI$

MW, 263

M.p. 137°. Sol. H_2O .Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 500.

4-Iodoanthranilic Acid.

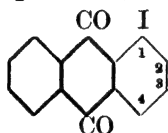
Prisms from EtOH.Aq. Decomp. at 208°. Sol. EtOH, Et_2O . Spar. sol. H_2O , C_6H_6 .
 N-Me: $C_8H_8O_2NI$. MW, 277. M.p. 197°.
 N-Et: $C_9H_{10}O_2NI$. MW, 291. M.p. 188° decomp.

Wheeler, Johns, *Am. Chem. J.*, 1910, **44**, 449.

5-Iodoanthranilic Acid.

Prisms from EtOH. M.p. 210°. Sol. ord. org. solvents.
 N-Acetyl: needles from 50% EtOH. M.p. 235°.

N-Et: $C_9H_{10}O_2NI$. MW, 291. Cryst. from EtOH. M.p. 162° decomp.

Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 500.Wheeler, Johns, *Am. Chem. J.*, 1910, **43**, 403.1-Iodoanthraquinone (α -Iodoanthraquinone) $C_{14}H_7O_2I$

MW, 334

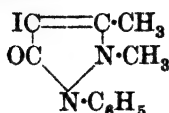
Cryst. from AcOH. M.p. 177°.

Laubé, *Ber.*, 1907, **40**, 3566.2-Iodoanthraquinone (β -Iodoanthraquinone).

Yellow needles from EtOH. M.p. 175-6°. Sol. C_6H_6 , toluene, $CHCl_3$, hot AcOH. Spar. sol. Et_2O , MeOH.

Scholl, Neovius, *Ber.*, 1911, **44**, 1088.Kaufler, *Ber.*, 1904, **37**, 60.

4-Iodoantipyrine

 $C_{11}H_{11}ON_2I$

MW, 314

Needles. M.p. 160-1°.

Emery, Palkin, *J. Am. Chem. Soc.*, 1916, **38**, 2166.Bougault, Robin, *Compt. rend.*, 1921, **172**, 452.Bougault, *Chem. Abstracts*, 1920, **14**, 177.

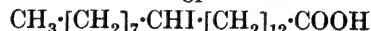
Iodoaspirin.

See under Iodosalicylic Acid.

12-(or 13-)Iodobehenic Acid



or

 $C_{22}H_{43}O_2I$

MW, 466

Solid. $Sn + HCl \rightarrow$ behenic acid.Ca salt: saiodin. Powder. Insol. H_2O , EtOH.Et ester: $C_{24}H_{47}O_2I$. MW, 494. M.p. 29°.Amide: $C_{22}H_{44}ONI$. MW, 465. Cryst. from EtOH.Aq. M.p. 78°.

Bayer, D.R.Ps., 248,993, (*Chem. Zentr.*, 1912, II, 395), 180,622, (*Chem. Zentr.*, 1907, I, 773); 186,214, (*Chem. Zentr.*, 1907, II, 956).

Epifanow, *Chem. Zentr.*, 1908, I, 2019.See also Abderhalden, Hirsch, *Z. physiol. Chem.*, 1911, **75**, 45.

o-Iodobenzaldehyde

CHO

 C_7H_5OI

MW, 232

M.p. 37°. Volatile in steam.

Oxime: m.p. 107-8°.

Semicarbazone: m.p. 206°.

Phenylhydrazone: m.p. 79°.

Weitzenböck, *Monatsh.*, 1913, **34**, 206.

m-Iodobenzaldehyde.

Prisms from EtOH. M.p. 57°.

Oxime: m.p. 62-3°.

Semicarbazone: m.p. 225-6°.

Phenylhydrazone: m.p. 155°.

p-Nitrophenylhydrazone: m.p. 212-13° (208°).

Patterson, *J. Chem. Soc.*, 1896, **69**, 1002.Shoppee, *J. Chem. Soc.*, 1932, 700.Hodgson, Beard, *J. Soc. Chem. Ind.*, 1926, **45**, 91r.

p-Iodobenzaldehyde.

Needles from EtOH.Aq. M.p. 77-8°. B.p. 264.5°/725 mm.

syn-Oxime: m.p. 160° (150°). Acetyl deriv.: m.p. 127°.

anti-Oxime: m.p. 122° (111°).

Semicarbazone : m.p. 224-5°.

Phenylhydrazone : m.p. 121°.

p-Nitrophenylhydrazone : m.p. 201°.

Willgerodt, Ucke, *J. prakt. Chem.*, 1912, 86, 276.

Shoppee, *J. Chem. Soc.*, 1931, 1232.

o-Iodobenzamide



C_7H_6ONI

MW, 247

Needles. M.p. 183-6°.

Remsen, Reid, *Am. Chem. J.*, 1899, 21, 289.

m-Iodobenzamide.

M.p. 186-5°.

See previous reference.

p-Iodobenzamide.

M.p. 217-6°.

See previous reference.

Iodobenzanilide.

See under Iodoaniline.

Iodobenzene



C_6H_5I

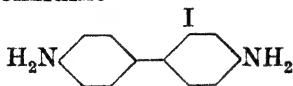
MW, 204

F.p. - 31-35°. M.p. - 30-5° (- 28-5°). B.p. 188-45°, 75°/10 mm. D_4^{15} 1-83829. $n_D^{17.8}$ 1-6213. Heat of comb. C_p 770-7 Cal., C_v 770-0 Cal. Sol. most org. solvents. Insol. H_2O .

Dains, Brewster, *Organic Syntheses*, 1929, IX, 46 (Bibl.).

Kimura, *Ber.*, 1934, 67, 394.

2-Iodobenzidine



$C_{12}H_{11}N_2I$

MW, 310

$B, 2HCl$: reddish-yellow cryst.
N : N'-Diacetyl : m.p. 310-11°.

Sako, *Bull. Chem. Soc. Japan*, 1934, 9, 153.

o-Iodobenzoic Acid



$C_7H_5O_2I$

MW, 248

Needles from H_2O . M.p. 162°. Sol. EtOH, Et_2O . Spar. sol. H_2O . $k = 1.4 \times 10^{-3}$ at 25°. Heat of comb. C_v 769-4 Cal. D^{20} 2-249.

Me ester : $C_8H_7O_2I$. MW, 262. B.p. 277-8°/729 mm., 167°/25 mm., 145-6°/16 mm.

Et ester : $C_9H_9O_2I$. MW, 276. B.p. 275°, 163-5°/23 mm., 148°/15 mm.

p-Nitrobenzyl ester : m.p. 110-8°.

Phenacyl ester : m.p. 71°.

p-Bromophenacyl ester : m.p. 110-2°.

l-Menthyl ester : $C_{17}H_{23}O_2I$. MW, 386. D_4^{19} 1-375. $[\alpha]_D^{19} - 61-35^\circ$.

Chloride : C_7H_4OClI . MW, 266-5. M.p. 35-40° (30-1°). B.p. 159°/27 mm., 135°/19 mm.

Amide : see o-Iodobenzamide.

Nitrile : C_7H_4NI . MW, 229. M.p. 54-5°.

Cattelain, *Bull. soc. chim.*, 1927, 41, 1547.

Hannon, Kenner, *J. Chem. Soc.*, 1934, 138.

Kelly, Segura, *J. Am. Chem. Soc.*, 1934, 56, 2497.

Cohen, Raper, *J. Chem. Soc.*, 1904, 85, 1272.

m-Iodobenzoic Acid.

Cryst. from Me_2CO . M.p. 187-8° (186-5°). Sol. EtOH. Spar. sol. H_2O . Sublimes. $k = 1.63 \times 10^{-4}$ at 25°.

Me ester : m.p. 54-5° (50°). B.p. 276-7°/739 mm., 149-50°/18 mm.

Et ester : b.p. 165-6°/24 mm., 150-5°/15 mm.

p-Nitrobenzyl ester : m.p. 121°.

Phenacyl ester : m.p. 115-16°.

p-Bromophenacyl ester : m.p. 127-8°.

l-Menthyl ester : D_4^{19} 1-376. $[\alpha]_D^{19} - 58-4^\circ$ in Py.

Chloride : b.p. 159-60°/23 mm.

Anhydride : $C_{14}H_8O_3I_2$. MW, 478. M.p. 134°.

Amide : see m-Iodobenzamide.

Cattelain, *Bull. soc. chim.*, 1927, 41, 1546.

Varma, Panicker, *J. Indian Chem. Soc.*, 1930, 7, 503.

Frankland, Carter, Adams, *J. Chem. Soc.*, 1912, 101, 2482.

See also last two references above.

p-Iodobenzoic Acid.

Cryst. from EtOH.Aq. M.p. 270° (267°). D^{20} 2-184. Sublimes.

Me ester : m.p. 114°.

Et ester : b.p. 153-5°/14 mm.

p-Nitrobenzyl ester : m.p. 140-6°.

Phenacyl ester : m.p. 101° decomp.

p-Bromophenacyl ester : m.p. 146-4°.

l-Menthyl ester : D_4^{19} 1-312. $[\alpha]_D^{19} - 69-7^\circ$ in C_6H_6 .

Chloride : m.p. 83° (77-8°). B.p. 163-4°/32 mm.

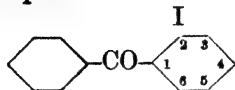
Anhydride: m.p. 228°.

Amide: see *p*-Iodobenzamide.

Whitmore, Woodward, *Organic Syntheses*, 1927, VII, 58 (*Bibl.*).

Kelly, Segura, *J. Am. Chem. Soc.*, 1934, 56, 2497.

2-Iodobenzophenone



$C_{13}H_9OI$

MW, 308

Cryst. M.p. 32°. B.p. 210–11°/13 mm.

Oxime: m.p. 152°.

Koopal, *Rec. trav. chim.*, 1915, 34, 156.

4-Iodobenzophenone.

Cryst. from MeOH. M.p. 100–1° (102–3°).

Oxime: (α) m.p. 178°; (β) m.p. 132–4°.

Bergmann, Hoffmann, Meyer, *J. prakt. Chem.*, 1932, 135, 258.

Iodobenzoquinone (*Iodoquinone*)



$C_6H_3O_2I$

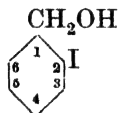
MW, 234

1-*Oxime*: *syn*-, m.p. 185–95°: *anti*-, decomp. about 185°.

Hodgson, Moore, *J. Chem. Soc.*, 1925, 2260.

Hodgson, Kershaw, *J. Chem. Soc.*, 1930, 1970.

o-Iodobenzyl Alcohol



C_7H_7OI

MW, 234

Needles from H_2O . M.p. 89.5–90°.

Olivier, *Rec. trav. chim.*, 1923, 42, 516.

m-Iodobenzyl Alcohol.

B.p. 165°/16 mm.

Cinnamate: m.p. 35°.

See previous reference and also

Clarke, Moore, McArthur, *Brit. Chem.*

Abstracts, 1935, 210.

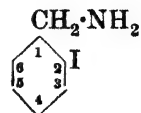
p-Iodobenzyl Alcohol.

Cryst. from CS_2 . M.p. 71–75°. Sol. EtOH, Et_2O , C_6H_6 , CS_2 . Spar. sol. H_2O .

Jackson, Mabery, *Ber.*, 1878, 11, 56.

Dict. of Org. Comp.—II.

o-Iodobenzylamine



C_7H_8NI

MW, 233

Liq.

N-Benzoyl: m.p. 154°.

Mabery, Robinson, *Am. Chem. J.*, 1882, 4, 103.

m-Iodobenzylamine.

B.p. 132°/8 mm.

N-Acetyl: needles from ligroin. M.p. 114.5°.

N-Benzoyl: plates from $CHCl_3$ –ligroin. M.p. 132°.

Picrate: needles from EtOH. M.p. 210° (decomp.).

Shoppee, *J. Chem. Soc.*, 1932, 702.

p-Iodobenzylamine.

M.p. 45°.

B, *HCl*: m.p. 240°.

Carbonate: m.p. 113°.

N-Acetyl: needles. M.p. 132°.

N-Benzylidene: needles from MeOH. M.p. 58–8°.

Picrate: m.p. 231° decomp.

Shoppee, *J. Chem. Soc.*, 1931, 1235.

Jackson, Mabery, *Am. Chem. J.*, 1880, 2, 257.

o-Iodobenzyl bromide



C_7H_6BrI

MW, 297

Prisms. M.p. 52–3°. Sol. C_6H_6 , CS_2 , $CHCl_3$, hot EtOH. Spar. sol. ligroin.

Mabery, Robinson, *Am. Chem. J.*, 1882, 4, 101.

m-Iodobenzyl bromide.

Prisms from ligroin. M.p. 50–50.5° (49–49.5°).

Shoppee, *J. Chem. Soc.*, 1932, 702.

Olivier, *Rec. trav. chim.*, 1923, 42, 516.

p-Iodobenzyl bromide.

Needles from EtOH. M.p. 78.75°. Sol. Et_2O , C_6H_6 , CS_2 . Spar. sol. EtOH, AcOH.

Wheeler, Clapp, *Am. Chem. J.*, 1908, 40, 460.

o-Iodobenzyl chloride

C₇H₆ClI

MW, 252.5

M.p. 28.5–29.5°.

Olivier, *Rec. trav. chim.*, 1923, 42, 516.

m-Iodobenzyl chloride.

M.p. 26.5–27.5°.

See previous reference.

p-Iodobenzyl chloride.

Yellow liq. Volatile in steam. CrO₃ → *p*-iodobenzoic acid.Caldwell, Werner, *J. Chem. Soc.*, 1907, 91, 248.

p-Iodobenzyl cyanide.

See under *p*-Iodophenylacetic Acid.

Iodobutane.

See *n*-Butyl iodide and *sec.*-*n*-Butyl iodide.

1-Iodo-1-butylene

C₄H₇I

MW, 182

Cis:

B.p. 168°.

Trans:Yellow oil. B.p. 127–8°, 57°/30 mm. Sol. Et₂O, EtOH, C₆H₆. Insol. H₂O.Kaufmann, Schweitzer, *Ber.*, 1922, 55, 260.

1-Iodo-2-butylene (Crotonyl iodide)

C₄H₇I

MW, 182

B.p. 132–3° decomp. (131–3°), 61–2°/50 mm. D₂₀ 1.6823.Charon, *Ann. chim.*, 1899, 17, 240.

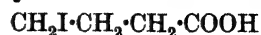
1-Iodobutyric Acid

C₄H₇O₂I

MW, 214

Needles from pet. ether. M.p. 41–2°. Sol. EtOH, Et₂O, pet. ether, Me₂CO. Spar. sol. H₂O.*Et ester*: C₆H₁₁O₂I. MW, 242. B.p. 190–2° decomp., 100–1°/21 mm. D₁₇ 1.570.Hell, *Ber.*, 1873, 6, 30.Sernow, *Chem. Zentr.*, 1901, I, 665.Bodroux, Taboury, *Compt. rend.*, 1907, 144, 1217.

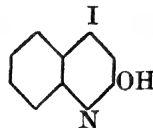
3-Iodobutyric Acid

C₄H₇O₂I

MW, 214

Cryst. M.p. 40–1°. Spar. sol. H₂O.*Me ester*: C₅H₉O₂I. B.p. 198–200°. D₅ 1.666.Henry, *Compt. rend.*, 1886, 102, 369.

4-Iodocarbostyryl (4-Iodo-2-hydroxyquinoline)

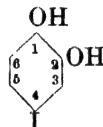
C₉H₆ONI

MW, 271

M.p. 276°. Sublimes.

Baeyer, Bloem, *Ber.*, 1882, 15, 2149.

4-Iodocatechol

C₆H₅O₂I

MW, 236

Leaflets from CCl₄. M.p. 92° (about 50°). Sol. EtOH, Et₂O, Me₂CO. Mod. sol. H₂O, C₆H₆, CHCl₃. Spar. sol. CCl₄, pet. ether. Sublimes. FeCl₃ → green col.

1 : 2-Diacetyl: b.p. 148–50°/0.8 mm.

1-*Me ether*: see 4-Iodoguaiacol.2-*Me ether*: see Guaiadol.Di-*Me ether*: see 4-Iodoveratrol.Fournau, Druey, *Compt. rend.*, 1934, 199, 870.

α-Iodocinnamic Acid

C₉H₇O₂I

MW, 274

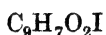
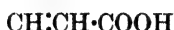
?-*Cis*:(i) Cryst. from C₆H₆. M.p. 130° decomp. *k* = 5.8 × 10⁻³ at 25°. (ii) Yellow cryst. M.p. 110–11°.*Me ester*: C₁₀H₉O₂I. MW, 288. B.p. 114–15/0.4 mm.?-*Trans*:Needles from C₆H₆. M.p. 162–3°. Sol. ord. org. solvents. Spar. sol. H₂O, pet. ether. *k* = 5 × 10⁻⁴ at 25°.*Me ester*: b.p. 132–3°/0.35 mm. D₄²⁰ 1.6679. n_D²⁰ 1.633.C₉H₇O₂I, C₆H₅·NH₂: m.p. 108°.Stoermer, Kirchner, *Ber.*, 1920, 53, 1291.James, *J. Chem. Soc.*, 1913, 103, 1369.

β -Iodocinnamic Acid

MW, 274

Cis:M.p. 187–8°. $k = 2.31 \times 10^{-4}$ at 25°.*Trans*:M.p. 127–8°. $k = 4 \times 10^{-4}$ at 25°.

See second reference above.

***o*-Iodocinnamic Acid**

MW, 274

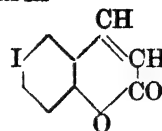
Cryst. from MeOH. M.p. 216–17°.

Me ester: $\text{C}_{10}\text{H}_9\text{O}_2\text{I}$. MW, 288. B.p. 300–10° decomp.*Et ester*: $\text{C}_{11}\text{H}_{11}\text{O}_2\text{I}$. MW, 302. B.p. 192°/22 mm.*m-Tolyl ester*: $\text{C}_{16}\text{H}_{13}\text{O}_2\text{I}$. MW, 364. M.p. 74°.*Chloride*: $\text{C}_9\text{H}_6\text{OClI}$. MW, 292.5. M.p. 63–4°.*Amide*: $\text{C}_9\text{H}_6\text{ONI}$. MW, 273. Plates from MeOH. M.p. 204–5°.Datta, Chatterjee, *J. Am. Chem. Soc.*, 1919, **41**, 295.Willstaedt, *Ber.*, 1931, **64**, 2691 (*Footnote*).Kindler, *Ann.*, 1928, **464**, 291.Weitzenböck, *Monatsh.*, 1913, **34**, 211.Kalle, D.R.P., 105,242, (*Chem. Zentr.*, 1900, I, 704).***m*-Iodocinnamic Acid.**M.p. 191–2° decomp. Sol. C_6H_6 , ligroin, hot EtOH. Spar. sol. H_2O .*Et ester*: m.p. 36–7°.*m-Tolyl ester*: m.p. 40–1°.*Benzyl ester*: m.p. 50°.*Chloride*: m.p. 35.3°.Gabriel, Herzberg, *Ber.*, 1883, **16**, 2039.Clarke, Moore, McArthur, *Brit. Chem. Abstracts*, 1935, 210.

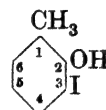
See also last reference above.

***p*-Iodocinnamic Acid.**

Cryst. from AcOH. M.p. 225° (255°).

Et ester: $\text{C}_{11}\text{H}_{11}\text{O}_2\text{I}$. MW, 302. M.p. 37°. B.p. 210°/20 mm.*m-Tolyl ester*: m.p. 85–6°.Kindler, *Ann.*, 1928, **464**, 291.Datta, Chatterjee, *J. Am. Chem. Soc.*, 1919, **41**, 295.Kalle, D.R.P., 105,242, (*Chem. Zentr.*, 1900, I, 704).**6-Iodocoumarin**

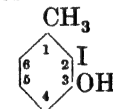
MW, 272

Needles. M.p. 165°. Sol. EtOH, Et_2O . Spar. sol. H_2O .Seidel, *J. prakt. Chem.*, 1899, **59**, 123.Dey, Row, *J. Chem. Soc.*, 1924, **125**, 560.**3-Iodo-*o*-cresol**

MW, 234

Me ether: $\text{C}_8\text{H}_9\text{OI}$. MW, 248. Oil. B.p. 200°/19 mm.Robinson, *J. Chem. Soc.*, 1916, **109**, 1084.**4-Iodo-*o*-cresol.**

M.p. 65°.

Hodgson, Moore, *J. Chem. Soc.*, 1926, 2037.**5-Iodo-*o*-cresol.***Me ether*: plates from AcOH. M.p. 79–80°.Robinson, *J. Chem. Soc.*, 1916, **109**, 1085.**6-Iodo-*o*-cresol.**Needles from H_2O . M.p. 90°.Noelting, *Ber.*, 1904, **37**, 1024.**2-Iodo-*m*-cresol**

MW, 234

Me ether: $\text{C}_8\text{H}_9\text{OI}$. MW, 248. M.p. 49°. B.p. 99°/1 mm.Sugii, Shindo, *Chem. Zentr.*, 1935, I, 698.**4-Iodo-*m*-cresol.***Me ether*: oil. B.p. 101°/1.5 mm.

See previous reference.

2-Iodo-*p*-cresol

MW, 234

Needles from H_2O . M.p. $63-4^\circ$. Sol. ord. org. solvents, hot H_2O .

Benzoyl: m.p. 53° .

Pummerer, Puttfarchin, Schlopflicher, *Ber.*, 1925, 58, 1818.

3-Iodo-*p*-cresol.

Needles from pet. ether. M.p. 35° . B.p. $117^\circ/12$ mm. Sol. ord. org. solvents. Insol. H_2O . Volatile in steam.

Me ether: C_8H_9OI . MW, 248. B.p. $237-8^\circ$.

Dimroth, *Ber.*, 1902, 35, 2859.

Schall, Drale, *Ber.*, 1884, 17, 2533.

1-Iodocrotonic Acid



$C_4H_5O_2I$ MW, 212

Colourless needles from H_2O . M.p. 113° .

Ingold, Smith, *J. Chem. Soc.*, 1931, 2745.

3-Iodocrotonic Acid



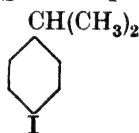
$C_4H_5O_2I$ MW, 212

Yellow cryst. from ligroin. M.p. 108° .

Et ester: $C_6H_9O_2I$. MW, 240. B.p. $90-2^\circ/2$ mm. slight decomp. Sol. ord. org. solvents. Spar. sol. ligroin. Lachrymatory and vesicant.

Braun, *J. Am. Chem. Soc.*, 1930, 52, 3174.

p-Iodocumene (*p*-Iodoisopropylbenzene)



$C_9H_{11}I$ MW, 246

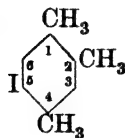
B.p. $236-8^\circ$.

Dichloride: *p*-isopropylphenyl iodide-chloride. $C_9H_{11}ICl_2$. Yellow powder. Decomp. at 110° .

Boedtker, *Bull. soc. chim.*, 1929, 45, 645.

Schreiner, *J. prakt. Chem.*, 1910, 81, 562.

5-Iodo- ψ -cumene (5-Iodo-1 : 2 : 4-trimethylbenzene)



$C_9H_{11}I$ MW, 246

Colourless flakes from EtOH. M.p. 37° . B.p. $256-8^\circ$. Heat with Cu at $260^\circ \rightarrow$ hexamethyl-diphenyl.

Dichloride (iodide-chloride): yellow cryst. Decomp. at 66° .

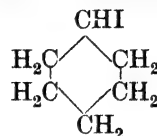
Morgan, Coulson, *J. Chem. Soc.*, 1929, 2553.

Elbs, Jaroslawzew, *J. prakt. Chem.*, 1913, 88, 93.

Willgerodt, Meyer, *Ann.*, 1911, 385, 341.

Wallach, Heusler, *Ann.*, 1888, 243, 233.

Iodocyclohexane (*Cyclohexyl iodide*)



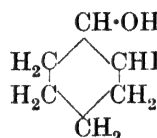
$C_6H_{11}I$ MW, 210

B.p. 180° slight decomp., $114^\circ/80$ mm., $100-1^\circ/45$ mm., $69^\circ/10$ mm. D_4^{20} 1.626. $Zn + HCl$ or $AcOH \rightarrow$ cyclohexane.

Rosanow, *Chem. Zentr.*, 1924, I, 2425.

Zelinsky, *Ber.*, 1901, 34, 2801.

2-Iodocyclohexanol



$C_6H_{11}OI$ MW, 226

Colourless prisms. M.p. 42° . Decomp. above 100° . Sublimes in vacuo. Volatile in steam with slight decomp. Insol. H_2O . Easily sol. most org. solvents. Hot $KOH.Aq. \rightarrow$ *cis*-cyclohexandiol-1 : 2. KOH or Ag_2O in $Et_2O \rightarrow$ cyclohexene oxide.

Me ether: $C_7H_{13}OI$. MW, 240. B.p. $114^\circ/49$ mm. D^{14} 1.565.

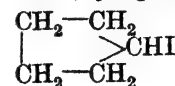
Et ether: $C_8H_{15}OI$. MW, 254. B.p. $118^\circ/47$ mm. D^{15} 1.484.

Tiffeneau, *Compt. rend.*, 1914, 159, 772.

Brunel, *Compt. rend.*, 1902, 135, 1056;

Ann. chim., 1905, 6, 219.

Iodocyclopentane (*Cyclopentyl iodide*)

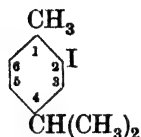


C_5H_9I MW, 196

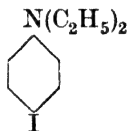
Oil. B.p. $166-7^\circ$, $78-9^\circ/46$ mm. D_4^{20} 1.7096. n_D^{20} 1.5447. Hot alc. $KOH \rightarrow$ cyclopentene. $Zn + HCl$ or $AcOH \rightarrow$ cyclopentane.

Rosanow, *Chem. Zentr.*, 1916, I, 925.

Wislicenus, Hentzschel, *Ann.*, 1893, 275, 324.

2-Iodo-*p*-cymene $C_{10}H_{13}I$

MW, 260

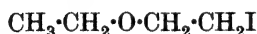
B.p. 139°/23 mm., 125°/14 mm. D^{14}_D 1.46.*Dichloride*: $C_{10}H_{13}ICl_2$. Yellow cryst. M.p. 92.5° decomp.Klages, *Ber.*, 1907, 40, 2368.Klages, Storp, *J. prakt. Chem.*, 1902, 65, 572.3-Iodo-*p*-cymene.B.p. 122-4°/13 mm., 80°/5 mm. D^{13}_D 1.52. Rapidly darkens in air.*Dichloride*: $C_{10}H_{13}ICl_2$. M.p. 87°.Klages, Storp, *J. prakt. Chem.*, 1902, 65, 573.Edinger, Goldberg, *Ber.*, 1900, 33, 2882.*p*-Iododiethylaniline $C_{10}H_{14}NI$

MW, 275

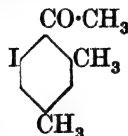
Colourless prisms from EtOH. M.p. 32°.

Samtleben, *Ber.*, 1898, 31, 1144.

2-Iododiethyl Ether

 C_4H_9OI

MW, 200

Pungent oil with mustard odour. B.p. 155°. D^{20}_D 1.667. n^{20}_D 1.4979.Schmidt, *Ann.*, 1904, 337, 60.Karvonen, *Chem. Zentr.*, 1912, II, 1270.Iododihydroxy-*p*-xylene.See Iodo- β -orcinol.6-Iodo-2 : 4-dimethylacetophenone (5-Iodo-4-aceto-*m*-xylene) $C_{10}H_{11}OI$

MW, 274

B.p. 295-8° decomp., 171°/25 mm.

Noyes, *Am. Chem. J.*, 1898, 20, 803.*o*-Iododimethylaniline $C_8H_{10}NI$

MW, 247

B.p. 116°/11 mm.

Baeyer, *Ber.*, 1905, 38, 2761.*m*-Iododimethylaniline.

Cryst. M.p. 38-9°. B.p. 142-3°/12 mm.

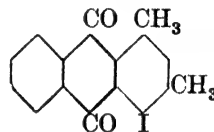
See previous reference.

p-Iododimethylaniline.

Leaflets from EtOH. M.p. 82° (79.5°).

Aitken, Reade, *J. Chem. Soc.*, 1926, 1896.Baeyer, *Ber.*, 1905, 38, 2762.

4-Iodo-1 : 3-dimethylantraquinone

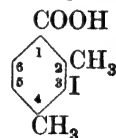
 $C_{16}H_{11}O_2I$

MW, 362

Cryst. from AcOH. M.p. 118-19°.

Scholl, *Ber.*, 1910, 43, 354.

3-Iodo-2 : 4-dimethylbenzoic Acid

 $C_9H_9O_2I$

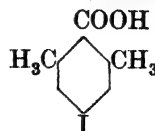
MW, 276

Prisms from EtOH.Aq. M.p. 167°. Sol. EtOH, C_6H_6 .Wheeler, Hoffmann, *Am. Chem. J.*, 1911, 45, 443.

6-Iodo-2 : 4-dimethylbenzoic Acid.

Cryst. from EtOH. M.p. 196-7°. Very spar. sol. H_2O .*Nitrile*: C_9H_8NI . MW, 257. Yellow needles from ligroin. M.p. 135°. Sol. EtOH, Et_2O . Insol. H_2O .Noyes, *Am. Chem. J.*, 1898, 20, 805.Kerschbaum, *Ber.*, 1895, 28, 2800.

4-Iodo-2 : 6-dimethylbenzoic Acid

 $C_9H_9O_2I$

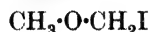
MW, 276

Yellow cryst. from MeOH. M.p. 199°. Sol. hot EtOH, hot AcOH, C_6H_6 , toluene.

Lock, Schmidt, *J. prakt. Chem.*, 1934, **140**, 230.

Cf. Hufferd, Noyes, *J. Am. Chem. Soc.*, 1921, **43**, 929.

Iododimethyl Ether



C_2H_5OI

MW, 172

B.p. 122° decomp., 39°/20 mm., 25°/13 mm. D_4^{20} 2.030. n_D^{20} 1.5472. Gradually turns brown.

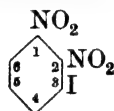
Karvonen, *Chem. Zentr.*, 1912, II, 1268; *Chem. Abstracts*, 1920, **14**, 2176.

Ewins, *Biochem. J.*, 1914, **8**, 371.

Iododinitroanisole.

See under Iododinitrophenol.

3-Iodo-1 : 2-dinitrobenzene



$C_6H_3O_4N_2I$

MW, 294

Yellow needles from EtOH. M.p. 138°. Distils undecomp. Sol. EtOH.

Wender, *Gazz. chim. ital.*, 1889, **19**, 231.

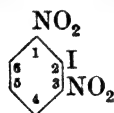
4-Iodo-1 : 2-dinitrobenzene.

Yellow plates from EtOH. M.p. 74.5°. Very sol. cold EtOH. Sol. Et_2O , $CHCl_3$. Heat with Cu at 230° \rightarrow tetranitrodiphenyl. Hot alc. NH_3 \rightarrow 5-iodo-2-nitroaniline.

Jacobson, Fertsch, Heubach, *Ann.*, 1898, **303**, 339.

Ullmann, Bielecki, *Ber.*, 1901, **34**, 2179.

2-Iodo-1 : 3-dinitrobenzene



$C_6H_3O_4N_2I$

MW, 294

Orange plates from EtOH. M.p. 114°. Very sol. EtOH, Et_2O . Aniline \rightarrow 2 : 4-dinitrodi-phenylamine.

Körner, Contardi, *Atti accad. Lincei*, 1914, **23**, II, 470.

4-Iodo-1 : 3-dinitrobenzene.

Yellow leaflets from EtOH, prisms or plates from Et_2O -EtOH. M.p. 88°. Spar. sol. cold EtOH. Sol. hot EtOH. Hot alc. NH_3 \rightarrow 2 : 4-dinitroaniline. Hot dil. alkalis \rightarrow 2 : 4-dinitrophenol.

Körner, *Gazz. chim. ital.*, 1874, **4**, 323.

5-Iodo-1 : 3-dinitrobenzene.

Golden plates from 60% EtOH. M.p. 99°.

Nicolet, *J. Am. Chem. Soc.*, 1927, **49**, 1813.

Iodo-1 : 4-dinitrobenzene



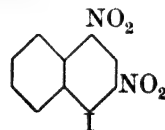
$C_6H_3O_4N_2I$

MW, 294

Yellow prisms from Et_2O -EtOH, colourless needles from EtOH. M.p. 117°. Sol. 8½ parts warm EtOH.

Körner, Contardi, *Atti accad. Lincei*, 1914, **23**, I, 286.

4-Iodo-1 : 3-dinitronaphthalene (1-Iodo-2 : 4-dinitronaphthalene)



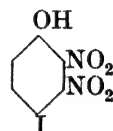
$C_{10}H_5O_4N_2I$

MW, 344

Pale straw-coloured micro-prisms from glycol ethyl ether. M.p. 183°.

Hodgson, Walker, *J. Chem. Soc.*, 1933, 1621.

4-Iodo-2 : 3-dinitrophenol



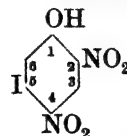
$C_6H_3O_5N_2I$

MW, 310

Yellowish-brown scales from EtOH.Aq. M.p. 140°.

Meldola, Hay, *J. Chem. Soc.*, 1907, **91**, 1483.

5-Iodo-2 : 4-dinitrophenol



$C_6H_3O_5N_2I$

MW, 310

Pale yellow needles from pet. ether. M.p. 98°. Volatile in steam.

Ag salt : golden-yellow needles from H_2O .

Me ether : 5-iodo-2 : 4-dinitroanisole.

$C_7H_5O_5N_2I$. MW, 324. Scales from EtOH. M.p. 119°.

Hodgson, Moore, *J. Chem. Soc.*, 1927, 634.
Meldola, Stephens, *J. Chem. Soc.*, 1906, 89, 928.

6-Iodo-2 : 4-dinitrophenol.

Citron-yellow needles from H_2O , prisms from EtOH. M.p. 106–7°. Sol. EtOH, Et_2O . Very spar. sol. H_2O . Volatile in steam.

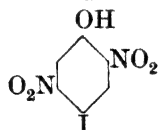
Acetyl : m.p. 113°.

p-Toluenesulphonyl : m.p. 149°.

Sane, Joshi, *J. Indian Chem. Soc.*, 1932, 9, 59.

Kempf, Moehrke, *Ber.*, 1914, 47, 2622.

4-Iodo-2 : 5-dinitrophenol



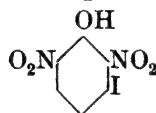
$C_6H_3O_5N_2I$ MW, 310

Citron-yellow needles from H_2O or EtOH. Aq. orange-yellow leaflets from ligroin. M.p. 114–15°. Sol. cold EtOH, C_6H_6 , $CHCl_3$, Me_2CO , hot ligroin.

Girard, *Bull. soc. chim.*, 1924, 35, 776.

Reverdin, *Ber.*, 1907, 40, 2857.

3-Iodo-2 : 6-dinitrophenol



$C_6H_3O_5N_2I$ MW, 310

Colourless needles from H_2O or pet. ether. M.p. 151–2°. Volatile in steam.

Ag salt : bright orange-red needles.

Hodgson, Moore, *J. Chem. Soc.*, 1927, 634.

4-Iodo-2 : 6-dinitrophenol.

Chrome-yellow needles from H_2O . M.p. 113°. Spar. sol. EtOH.

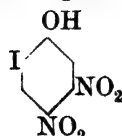
Benzoyl : m.p. 175°.

p-Toluenesulphonyl : m.p. 138°.

Sane, Joshi, *J. Indian Chem. Soc.*, 1932, 9, 59.

Körner, *Gazz. chim. ital.*, 1874, 4, 397.

6-Iodo-3 : 4-dinitrophenol

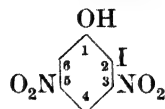


$C_6H_3O_5N_2I$ MW, 310

Me ether : 6-iodo-3 : 4-dinitroanisole. $C_7H_5O_5N_2I$. MW, 324. Yellow scales from EtOH. M.p. 146–7°.

Meldola, Stephens, *J. Chem. Soc.*, 1905, 87, 1202.

2-Iodo-3 : 5-dinitrophenol



$C_6H_3O_5N_2I$ MW, 310

Me ether : 2-iodo-3 : 5-dinitroanisole. $C_7H_5O_5N_2I$. MW, 324. Yellowish-brown needles from EtOH. M.p. 141·5°.

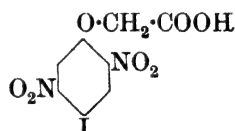
Meldola, Hay, *J. Chem. Soc.*, 1907, 91, 1478.

4-Iodo-3 : 5-dinitrophenol.

Me ether : 4-iodo-3 : 5-dinitroanisole. Yellowish-brown prisms from EtOH. M.p. 161–2°.

See previous reference.

4-Iodo-2 : 5-dinitrophenoxyacetic Acid

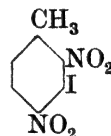


$C_8H_5O_7N_2I$ MW, 368

Pale yellow needles from dil. AcOH. M.p. 201–2°. Sol. Me_2CO , hot EtOH. Spar. sol. C_6H_6 , $CHCl_3$.

Reverdin, *Ber.*, 1907, 40, 2857; 1906, 39, 2684.

3-Iodo-2 : 4-dinitrotoluene

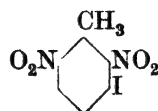


$C_7H_5O_4N_2I$ MW, 308

Yellow leaflets from EtOH. M.p. 117°.

Brady, Bowman, *J. Chem. Soc.*, 1921, 119, 897.

3-Iodo-2 : 6-dinitrotoluene

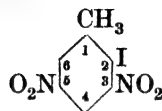


$C_7H_5O_4N_2I$ MW, 308

Plates or prisms from EtOH. M.p. 90°. Mod. sol. warm EtOH. Volatile in steam.

Körner, Contardi, *Gazz. chim. ital.*, 1917, 47, I, 238.

2-Iodo-3 : 5-dinitrotoluene



$C_7H_5O_4N_2I$

MW, 308

Lemon-yellow plates or prisms from EtOH-Et₂O. M.p. 119.5°.

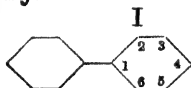
Körner, Contardi, *Atti accad. Lincei*, 1915, 24, I, 896.

4-Iodo-3 : 5-dinitrotoluene.

Lemon-yellow needles from EtOH. M.p. 158°. Alc. NH₃ at 130° → 3 : 5-dinitro-*p*-toluidine.

Körner, Contardi, *Atti accad. Lincei*, 1914, 23, II, 464.

2-Iododiphenyl



$C_{12}H_9I$

MW, 280

B.p. 189-92°/36 mm., 158°/6 mm., 140°/3-4 mm. D_{25}^{25} 1.6038.

Gilman, Kirby, Kinney, *J. Am. Chem. Soc.*, 1929, 51, 2261.

Cook, *J. Chem. Soc.*, 1930, 1090.

Bowden, *J. Chem. Soc.*, 1931, 1112.

3-Iododiphenyl.

B.p. 188-9°/16 mm.

See last reference above.

4-Iododiphenyl.

Cryst. from EtOH or AcOH. M.p. 113-14°. B.p. 320° slight decomp., 222°/40 mm., 183° (198°)/11 mm.

Dichloride : $C_6H_5 \cdot C_6H_4ICl_2$. Yellow needles from CHCl₃. M.p. 102° decomp.

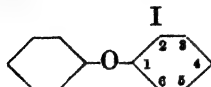
Rupe, Iselin, *Ber.*, 1916, 49, 45.

Pfeiffer, Schmitz, Inoue, *J. prakt. Chem.*, 1929, 121, 73.

Iododiphenyl-carbimide.

See 4'-Iododiphenyl-4-isocyanate.

2-Iododiphenyl Ether



$C_{12}H_9OI$

MW, 296

Cryst. from ligroin. M.p. 55-6°. B.p. 198-202°/32 mm., 180-5°/15 mm.

Dichloride : $C_6H_5 \cdot O \cdot C_6H_4ICl_2$. M.p. 81-2°. Unstable.

Brewster, Strain, *J. Am. Chem. Soc.*, 1934, 56, 117.

Lesslie, Turner, *J. Chem. Soc.*, 1932, 282.

Buchan, McCombie, *J. Chem. Soc.*, 1931, 142.

Clarkson, Gomberg, *J. Am. Chem. Soc.*, 1930, 52, 2885.

3-Iododiphenyl Ether.

B.p. 185°/14 mm.

Dichloride : m.p. 58°. Unstable.

Buchan, McCombie, *J. Chem. Soc.*, 1932, 2859.

See also first reference above.

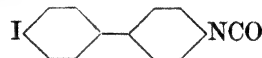
4-Iododiphenyl Ether.

Plates from MeOH.Aq. M.p. 48°.

Brewster, Strain, *J. Am. Chem. Soc.*, 1934, 56, 117.

Scarborough, *J. Chem. Soc.*, 1929, 2367.

4'-Iododiphenyl-4-isocyanate (4'-Iododiphenyl-4-carbimide)



$C_{13}H_8ONI$

MW, 321

Pale yellow cryst. from toluene. M.p. 100-1°. Sol. ord. org. solvents. Forms highly cryst. urethanes with alcohols.

Kawai, Tamura, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1930, 13, 266, 270; *J. Chem. Soc. Abstracts*, A, 1930, 1159.

Iodoethane.

See Ethyl iodide.

2-Iodoethyl Alcohol.

See Ethylene iodohydrin.

2-Iodoethylamine (2-Iodo-1-aminoethane, 2-aminoethyl iodide)



C_2H_5NI

MW, 171

B,HI : colourless cryst. from EtOH. M.p. 192-4° (with sintering and browning).

Picrate : m.p. 129-31°.

Gabriel, *Ber.*, 1888, 21, 1055.

Iodoethylene.

See Vinyl iodide.

2-Iodoethyl phenyl Ether (β-Iodophenetole)



C_8H_9OI

MW, 248.

Cryst. from EtOH.Aq. M.p. 31-2°. Sol. ord. org. solvents.

Braun, *Ber.*, 1913, **46**, 1788.

Iodoform (Tri-iodomethane)



CHI_3

MW, 394

Yellow hexagonal plates from Me_2CO . M.p. 119°. Sol. EtOH, Et_2O , AcOH, CHCl_3 . Prac. insol. H_2O , C_6H_6 . Heat of comb. C_p 161.9 Cal. Decomp. slowly in light. Volatile in steam. Hot KOH.Aq. $\rightarrow \text{KI} + \text{H}\cdot\text{COOK}$. Powerful antiseptic.

Glasstone, *Industrial Chemist*, 1931, **7**, 315.

Vyskočil, *Chem. Abstracts*, 1929, **23**, 4896.
Datta, Prosad, *J. Am. Chem. Soc.*, 1917, **39**, 453.

Otto, D.R.P., 109,013, (*Chem. Zentr.*, 1900, II, 304).

Iodoformanilide.

See under *p*-Iodoaniline.

Iodofumaric Acid



$\text{C}_4\text{H}_3\text{O}_4\text{I}$

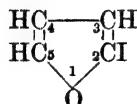
MW, 242

Yellow prisms from Et_2O . M.p. 193-4° (182-4°) decomp. Very sol. H_2O , EtOH, Et_2O . Rapidly attacked by KMnO_4 in Na_2CO_3 .Aq.

Di-Me ester: $\text{C}_6\text{H}_7\text{O}_4\text{I}$. MW, 270. Yellow prisms from pet. ether. M.p. 52.5°. Sol. ord. org. solvents.

Thiele, Peter, *Ann.*, 1909, **369**, 122.

2-Iodofuran



$\text{C}_4\text{H}_5\text{OI}$

MW, 194

B.p. 43-5°/15 mm. D_4^{20} 2.024. n_D^{20} 1.5661. Decomp. on standing. More stable in Et_2O sol. Readily forms Grignard reagent.

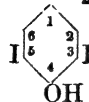
Gilman, Wright, *J. Am. Chem. Soc.*, 1933, **55**, 3307.

3-Iodofuran.

B.p. 132°/732 mm., 37-8°/22 mm. D_4^{20} 2.045. n_D^{20} 1.5610. Stable. Does not form Grignard reagent.

See previous reference.

Iodogorgoic Acid (3:5-Di-iodotyrosine, 4-hydroxy-3:5-di-iodo- β -phenyl- α -aminopropionic acid)



$\text{C}_9\text{H}_9\text{O}_3\text{NI}_2$

MW, 433

Occurs in the skeletal proteins of corals, sponges, and other marine organisms, also in thyroid gland.

d-. Thin yellowish-white plates. M.p. 213° (194°) decomp.

Anhydride: decomp. at 204°. Sol. MeOH, EtOH, AcOEt. Insol. H_2O .

l-. Needles from H_2O or 70% EtOH. M.p. 213°.

Sol. 347 parts H_2O at 15°. $[\alpha]_D^{20} +2.89^\circ$ in 4% HCl.

Me ester: $\text{C}_{10}\text{H}_{11}\text{O}_3\text{NI}_2$. MW, 447. Plates from EtOH. M.p. 192° decomp. (browns at 187°). Sol. AcOH. Very spar. sol. hot H_2O , hot EtOH. Insol. Et_2O , C_6H_6 . *B, HCl*: needles from EtOH- Et_2O . Decomp. at 211°. *N-Chloroacetyl*: m.p. 149°.

N-Chloroacetyl: prismatic needles from EtOH. Aq. Decomp. at 221°. Sol. EtOH, Me_2CO . Spar. sol. hot H_2O .

dl-. Cryst. from 70% EtOH, rectangular plates from H_2O . M.p. 200° (not sharp) decomp. Sol. 2164 parts H_2O at 15°.

Harington, Randall, *Biochem. J.*, 1931, **25**, 1032.

Sugimoto, *J. Biol. Chem.*, 1928, **76**, 723.

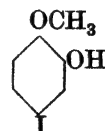
Abderhalden, Haas, *Z. physiol. Chem.*, 1927, **186**, 78.

Wheeler, Johns, *Am. Chem. J.*, 1910, **43**, 11.

Abderhalden, Guggenheim, *Ber.*, 1908, **41**, 1238, 1991.

Henze, *Z. physiol. Chem.*, 1907, **51**, 64.

4-Iodoguaiacol (4-Iodocatechol 1-methyl ether)



$\text{C}_7\text{H}_7\text{O}_2\text{I}$

MW, 250

Cryst. from EtOH. M.p. 87-8°. Spar. sol.

cold H₂O. Mod. sol. hot H₂O. Sol. ord. org. solvents. Volatile in steam.

Mameli, *Gazz. chim. ital.*, 1907, **37**, II, 372.

Tassily, Leroide, *Bull. soc. chim.*, 1908, **3**, 125.

5-Iodoguaiacol.

See Guaiadol.

1-Iodoheptadecane.

See *n*-Heptadecyl iodide.

1-Iodoheptane (n-Heptyl iodide)

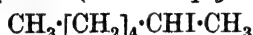


C₇H₁₅I MW, 226

B.p. 204°, 97°/26 mm., 91°/17 mm. D₄¹⁵ 1.3870.

Sherrill, *J. Am. Chem. Soc.*, 1930, **52**, 1985.

2-Iodoheptane (sec.-n-Heptyl iodide)



C₇H₁₅I MW, 226

B.p. 98°/50 mm. D₂₀ 1.304. n_D²⁰ 1.4826. Decomp. on exposure to light.

Henry, *Rec. trav. chim.*, 1909, **28**, 447.

Venable, *Ber.*, 1880, **13**, 1650.

3-Iodoheptane



C₇H₁₅I MW, 226

B.p. 89°/30 mm., 64.5°/9 mm. D₄¹⁵ 1.3735.

Sherrill, *J. Am. Chem. Soc.*, 1930, **52**, 1985.

4-Iodoheptane



C₇H₁₅I MW, 226

B.p. 185° part decomp., 65–7°/9 mm. very slight decomp.

Piccard, Brewster, *J. Am. Chem. Soc.*, 1921, **43**, 2628.

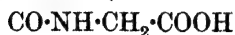
Iodohexacosane.

See Hexacosyl iodide.

Iodohexane.

See Hexyl iodide.

o-Iodohippuric Acid (o-Iodobenzoylglycine)



C₉H₉O₃NI MW, 305

Colourless slender needles from H₂O. M.p. 170° (167°). Sol. hot H₂O, Et₂O, EtOH, AcOEt, CHCl₃. Very spar. sol. cold H₂O, C₆H₆. HCl at 110° → o-iodobenzoic acid + glycine.

Et ester: C₁₁H₁₂O₃NI. MW, 333. Prisms

from ligroin. M.p. 79–80° (softens at 70°). Very sol. EtOH, C₆H₆.

Nitrile: C₉H₇ON₂I. MW, 286. Prisms from EtOH. M.p. 158°.

Novello, Miriam, Sherwin, *J. Biol. Chem.*, 1926, **67**, 563.

Johnson, Meade, *Am. Chem. J.*, 1906, **36**, 296.

m-Iodohippuric Acid.

Thin plates from H₂O. M.p. 155–6° (167–9°). Mod. sol. hot H₂O, EtOH, Et₂O. Insol. Me₂CO, CHCl₃, CCl₄, C₆H₆.

See first reference above.

p-Iodohippuric Acid.

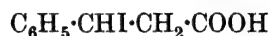
Leaflets from H₂O. M.p. 193° (188–9°). Sol. EtOH, AcOEt. Very spar. sol. cold H₂O. Insol. Me₂CO, Et₂O, CCl₄.

Et ester: plates from EtOH. M.p. 128–9°.

Nitrile: prisms from EtOH. M.p. 191–2°.

See references under o-Iodohippuric Acid, *supra*.

β-Iodohydrocinnamic Acid

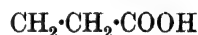


C₉H₉O₂I MW, 276

Colourless cryst. from CS₂. M.p. 119–20° decomp. Hot H₂O → HI + cinnamic acid. Hot Na₂CO₃.Aq. → HI + CO₂ + styrene.

Fittig, Binder, *Ann.*, 1879, **195**, 133.

o-Iodohydrocinnamic Acid



C₉H₉O₂I MW, 276

Leaflets from H₂O. M.p. 102–3°.

Gabriel, Herzberg, *Ber.*, 1883, **16**, 2037.

m-Iodohydrocinnamic Acid.

Colourless leaflets. M.p. 65–6°.

See previous reference.

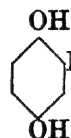
p-Iodohydrocinnamic Acid.

Colourless prisms from H₂O. M.p. 140–1°. Conc. H₂SO₄ → 6-iodohydrindone.

Miersch, *Ber.*, 1892, **25**, 2113.

See also previous reference.

Iodohydroquinone



C₆H₅O₂I

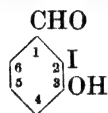
MW, 236

Di-Me ether: $C_8H_8O_2I$. MW, 264. M.p. 23°. B.p. 285° (slight decomp.)/728 mm., 157°/10 mm. Turns dark green col. on standing.

Kaufmann, Fritz, *Ber.*, 1908, **41**, 4416.
Ullmann, Löwenthal, *Ann.*, 1904, **332**, 69.

Iodo-*o*-hydroxybenzaldehyde.

See Iodosalicylaldehyde.

2-Iodo-*m*-hydroxybenzaldehyde

$C_7H_5O_2I$ MW, 248

Me ether: $C_8H_7O_2I$. MW, 262. Yellow needles from MeOH. M.p. 86–7°. Volatile in steam.

Mayer, *Ber.*, 1912, **45**, 1109.

6-Iodo-*m*-hydroxybenzaldehyde.

Me ether: needles from C_6H_6 -ligroin. M.p. 114–15°.

Mayer, *Ber.*, 1914, **47**, 410.

2-Iodo-*p*-hydroxybenzaldehyde

$C_7H_5O_2I$ MW, 248

Very pale yellow needles from EtOH. M.p. 163°.

Benzoyl: m.p. 112°.

Oxime: m.p. 155°.

Semicarbazone: m.p. 232°.

p-Nitrophenylhydrazone: m.p. 265° decomp.

Me ether: see 2-Iodoanisaldehyde.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3043.

3-Iodo-*p*-hydroxybenzaldehyde.

Leaflets from hot H_2O . M.p. 108°. Sol. ord. org. solvents. Volatile in steam. Hot NaOH.Aq. at 150–80° → protocatechuic aldehyde.

Me ether: see 3-Iodoanisaldehyde.

Paal, *Ber.*, 1895, **28**, 2413.

Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).

Iodo-*o*-hydroxybenzoic Acid.

See Iodosalicylic Acid.

2-Iodo-*m*-hydroxybenzoic Acid

$C_7H_5O_3I$ MW, 264

Needles from $CHCl_3$. M.p. 158–9°.

Me ether: $C_8H_7O_3I$. MW, 278. Yellow needles from EtOH.Aq. M.p. 150–1°. *Me ester*: $C_9H_9O_3I$. MW, 292. Prisms from C_6H_6 -pet. ether. M.p. 57°.

Acetyl: needles from C_6H_6 . M.p. 179–80°.

Kenner, Turner, *J. Chem. Soc.*, 1928, 2341.

Henry, Sharp, *J. Chem. Soc.*, 1935, 856.

4-Iodo-*m*-hydroxybenzoic Acid.

Needles. M.p. 226° decomp. Spar. sol. cold H_2O .

Acetyl: m.p. 203°.

Brenans, Prost, *Compt. rend.*, 1924, **178**, 1285.

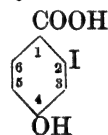
6-Iodo-*m*-hydroxybenzoic Acid.

Needles from H_2O . Begins to sublime at 160°, sinters at 196°, m.p. 198°.

Acetyl: m.p. 157°.

Datta, Prosad, *J. Am. Chem. Soc.*, 1917, **39**, 448.

See also previous reference.

2-Iodo-*p*-hydroxybenzoic Acid

$C_7H_5O_3I$ MW, 264

Needles from H_2O . M.p. 179° (215°) decomp. No col. with $FeCl_3$.

Acetyl: m.p. 146°.

Me ether: see 2-Iodoanisic Acid.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3043.

Brenans, Prost, *Compt. rend.*, 1924, **178**, 1555.

3-Iodo-*p*-hydroxybenzoic Acid.

Needles from SO_2 .Aq. M.p. 174°. Sublimes. Very sol. EtOH, Et_2O . Mod. sol. AcOH, hot H_2O . Spar. sol. hot C_6H_6 , $CHCl_3$. Insol. ligroin. $FeCl_3$ → brownish ppt.

Acetyl: m.p. 172°.

Me ester: $C_8H_7O_3I$. MW, 278. Glittering needles from ligroin. M.p. 155–6°.

Et ester: $C_9H_9O_3I$. MW, 292. M.p. 117°.

Me ether: see 3-Iodoanisic Acid.

Et ether: $C_9H_7O_2I$. MW, 292. Pearly scales (by sublimation). M.p. 215°.

Auwers, *Ber.*, 1897, **30**, 1475.

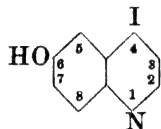
Willgerodt, Burkhard, *Ann.*, 1912, **389**, 299.

Brenans, Prost, *Compt. rend.*, 1923, **177**, 768.

4-Iodo-2-hydroxyquinoline.

See 4-Iodocarbostyryl.

4-Iodo-6-hydroxyquinoline



C_9H_6ONI

MW, 271

Pale yellow cryst. from Et_2O . M.p. 283°. Sol. ord. org. solvents. Spar. sol. $CHCl_3$.

Me ether: $C_{10}H_8ONI$. MW, 285. M.p. 85°.

John, Andraschko, *J. prakt. Chem.*, 1930, **128**, 215.

5-Iodo-6-hydroxyquinoline.

Cryst. M.p. 195°.

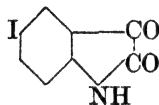
Claus, D.R.P., 78,880.

5-Iodo-8-hydroxyquinoline.

M.p. 127-8°.

Matsumura, *J. Am. Chem. Soc.*, 1927, **49**, 815.

5-Iodoisatin



$C_8H_4O_2NI$

MW, 273

Red plates from $EtOH$. M.p. 264-5°. Spar. sol. $EtOH$, $AcOH$.

Hydrazone: m.p. about 170°.

2-Anil: m.p. 223-4°.

Borsche, Weussmann, Fritsche, *Ber.*, 1924, **57**, 1770.

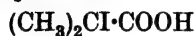
Hicks, *J. Chem. Soc.*, 1925, 773.

Musajo, *Chem. Abstracts*, 1933, **27**, 92.

Iodoisobutane.

See Isobutyl iodide and *tert.*-Butyl iodide.

1-Iodoisobutyric Acid



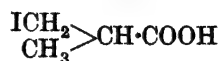
$C_4H_7O_2I$

MW, 214

Prisms. M.p. 73.5°. Sol. H_2O , $EtOH$, Et_2O .

Sernow, *Chem. Zentr.*, 1901, **I**, 665; 1900, **I**, 960.

2-Iodoisobutyric Acid



$C_4H_7O_2I$

MW, 214

Plates from CS_2 . M.p. 36°. Spar. sol. H_2O .

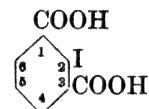
Johansson, *Chem. Zentr.*, 1916, **II**, 558.

Fittig, Paul, *Ann.*, 1877, **188**, 58.

Iodoisopentane.

See *active*-Amyl iodide, *tert.*-Amyl iodide, and Isoamyl iodide.

2-Iodoisophthalic Acid



$C_8H_5O_4I$

MW, 292

Cryst. from H_2O . M.p. 236-8° (impure).

Me ester: $C_{10}H_9O_4I$. MW, 320. M.p. 50°.

James, Kenner, Stubbings, *J. Chem. Soc.*, 1920, **117**, 774.

4-Iodoisophthalic Acid.

M.p. 285-6°. Sol. $EtOH$, Et_2O , $AcOH$. Spar. sol. H_2O .

Grahl, *Ber.*, 1895, **28**, 89.

5-Iodoisophthalic Acid.

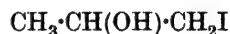
Needles from hot $AcOH$. M.p. 288-9°. Sol. $EtOH$, Et_2O , $AcOH$. Spar. sol. H_2O .

Di-Me ester: $C_{10}H_9O_4I$. MW, 320. M.p. 104-5°.

Di-Et ester: $C_{12}H_{13}O_4I$. MW, 348. M.p. 76°.

Burton, Kenner, *J. Chem. Soc.*, 1923, **123**, 1044.

1-Iodoisopropyl Alcohol (1-Propylene iodo-hydrin)



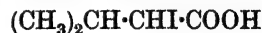
C_3H_7OI

MW, 186

B.p. 105°/60 mm.

Markownikow, *Z. Chem.*, 1870, 423.

1-Iodoisovaleric Acid



$C_5H_9O_2I$

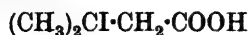
MW, 228

Prisms from pet. ether. M.p. 52°. Sol. ord. org. solvents. Insol. H_2O .

Guaiacol ester: m.p. 76-9°.

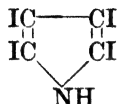
Sernow, *Chem. Zentr.*, 1901, **I**, 665.

Berendes, U.S.P., 994,494, (*Chem. Abstracts*, 1911, **5**, 2531).

2-Iodoisovaleric Acid $\text{C}_5\text{H}_9\text{O}_2\text{I}$

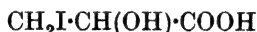
MW, 228

M.p. 79–80°.

Schirokow, *J. prakt. Chem.*, 1881, **23**, 285.**Iodol** (*Iodole, tetra-iodopyrrole*) C_4HNI_4

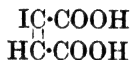
MW, 571

Yellow needles from EtOH.Aq. Decomp. at 140–50°. Sol. Et₂O, AcOH, hot EtOH. Insol. H₂O. Heat of comb. C, 503.3 Cal. Antiseptic.

Ciamician, Silber, *Ber.*, 1885, **18**, 1766.Michelman, *Chem. Abstracts*, 1925, **19**, 2388.**2-Iodolactic Acid** $\text{C}_3\text{H}_5\text{O}_3\text{I}$

MW, 216

Prisms. M.p. 84–5° (100–1°). Sol. H₂O, EtOH, Et₂O.

Glinsky, *Ber.*, 1873, **6**, 1257.Melikow, *Ber.*, 1881, **14**, 937.**Iodomaleic Acid** $\text{C}_4\text{H}_3\text{O}_4\text{I}$

MW, 242

Prisms from Et₂O. M.p. 153–4°.Thiele, Peter, *Ann.*, 1909, **369**, 123.**Iodomenthane.**

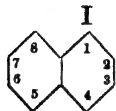
See Menthyl iodide.

Iodomethane.

See Methyl iodide.

4-Iodo-2-methoxybenzoic Acid.

See under 4-Iodosalicylic Acid.

1-Iodonaphthalene (α -Iodonaphthalene, α -naphthyl iodide) $\text{C}_{10}\text{H}_7\text{I}$

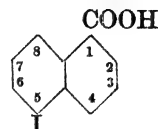
MW, 254

Oil. B.p. 302° (305°). Sol. EtOH, Et₂O, C₆H₆, CS₂. D₁₅ 1.7344.

Picrate: m.p. 127°.

Birckenbach, Goubeau, *Ber.*, 1932, **65**, 398.**2-Iodonaphthalene** (β -Iodonaphthalene, β -naphthyl iodide).

Leaflets. M.p. 54–5° (53–4°). B.p. 308–10°, 175°/25 mm., 172°/21 mm. Sol. EtOH, Et₂O, AcOH. Volatile in steam.

Schmidlin, Huber, *Ber.*, 1910, **43**, 2829.**5-Iodo-1-naphthoic Acid** $\text{C}_{11}\text{H}_7\text{O}_2\text{I}$

MW, 298

Needles from AcOH. M.p. 253–4°. Sublimes.

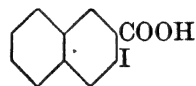
Me ester: C₁₂H₉O₂I. MW, 312. M.p. 81–2°.Seer, Scholl, *Ann.*, 1913, **398**, 92.**8-Iodo-1-naphthoic Acid.**

Brown prisms from hot H₂O. M.p. 164–5°. Sol. EtOH, Et₂O, AcOH, C₆H₆.

Me ester: m.p. 59°.

Et ester: C₁₃H₁₁O₂I. MW, 326. M.p. 64–5°.

Anilide: m.p. 171–5°.

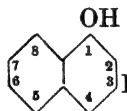
Goldstein, Francey, *Helv. Chim. Acta*, 1932, **15**, 1362.**3-Iodo-2-naphthoic Acid** $\text{C}_{11}\text{H}_7\text{O}_2\text{I}$

MW, 298

Needles from AcOH.Aq. M.p. 214°. Sol. EtOH, Et₂O, AcOH, C₆H₆, CHCl₃. Spar. sol. H₂O.

Me ester: C₁₂H₉O₂I. MW, 312. M.p. 55°.Et ester: C₁₃H₁₁O₂I. MW, 326. M.p. 78°.Amide: C₁₁H₈ONi. MW, 297. M.p. 241°.

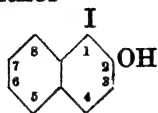
Anilide: m.p. 205°.

Goldstein, Cornamusaz, *Helv. Chim. Acta*, 1931, **14**, 200.**3-Iodo-1-naphthol** $\text{C}_{10}\text{H}_7\text{OI}$

MW, 270

Yellow needles from EtOH. M.p. 119°.

Hodgson, Elliott, *J. Chem. Soc.*, 1934, 1707.**5-Iodo-1-naphthol.**Needles from hot H₂O. M.p. 131–2°.Me ether: C₁₁H₉OI. MW, 284. M.p. 78–9°.Scholl, *Monatsh.*, 1921, **42**, 406.

1-Iodo-2-naphthol $C_{10}H_7OI$

MW, 270

Needles from EtOH.Aq. M.p. 94.5° (90°).
Spar. sol. H_2O .

Carbonate: m.p. $188-9^\circ$.

Kryn'ski, *Chem. Abstracts*, 1928, **22**, 4120.
Marsh, *J. Chem. Soc.*, 1927, 3164.

3-Iodo-2-naphthol.

Needles from EtOH. M.p. 104° . Sol. EtOH,
 Et_2O , AcOH, C_6H_6 , $CHCl_3$, hot H_2O .

Me ether: $C_{11}H_9OI$. MW, 284. M.p. 65° .

Goldstein, Cornamusaz, *Helv. Chim. Acta*,
1932, **15**, 938.

3-Iodo-1-naphthylamine $C_{10}H_8NI$

MW, 269

Needles from EtOH. M.p. 84° .

B.HCl: needles from EtOH. M.p. 238° .

N-Acetyl: prisms from AcOH. M.p. 207° .

N-Benzoyl: needles. M.p. 174° .

Hodgson, Elliott, *J. Chem. Soc.*, 1934,
1707.

4-Iodo-1-naphthylamine.

M.p. $82-4^\circ$ decomp.

Morgan, Godden, *J. Chem. Soc.*, 1910, **97**,
1717.

5-Iodo-1-naphthylamine.

Needles from MeOH. M.p. $75-75.5^\circ$.

B.HCl: m.p. $205-15^\circ$.

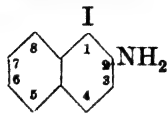
Scholl, *Monatsh.*, 1921, **42**, 406.

8-Iodo-1-naphthylamine.

Cryst. from MeOH. M.p. 82° .

B.HCl: m.p. $186-9^\circ$ decomp.

Scholl, Seer, Weitzenböck, *Ber.*, 1910, **43**,
2207.

1-Iodo-2-naphthylamine $C_{10}H_8NI$

MW, 269

Leaflets from H_2O . M.p. 108° .

N-Acetyl: decomp. at 167° .

Willstaedt, Scheiber, *Ber.*, 1934, **67**, 474.

3-Iodo-2-naphthylamine.

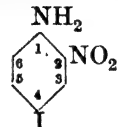
Cryst. from EtOH. M.p. 137° . Sol. EtOH,
AcOH, $CHCl_3$. Mod. sol. C_6H_6 .

N-Acetyl: m.p. 198° .

Goldstein, Cornamusaz, *Helv. Chim. Acta*,
1932, **15**, 937.

Iodonitroacetanilide.

See under Iodonitroaniline.

4-Iodo-*o*-nitroaniline $C_6H_5O_2N_2I$

MW, 264

Orange-yellow needles from EtOH. M.p. 123° .
Sol. EtOH, AcOH.

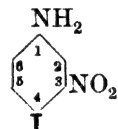
N-Acetyl: 4-iodo-2-nitroacetanilide.
 $C_8H_7O_3N_2I$. MW, 306. M.p. 112° .

Brenans, *Compt. rend.*, 1914, **158**, 717,
1158.

5-Iodo-*o*-nitroaniline.

Brown needles from EtOH. M.p. 174° .

Wender, *Gazz. chim. ital.*, 1889, **19**, 234.

4-Iodo-*m*-nitroaniline $C_6H_5O_2N_2I$

MW, 264

Orange needles from EtOH. M.p. 142° .

N-Acetyl: 4-iodo-3-nitroacetanilide.
 $C_8H_7O_3N_2I$. MW, 306. M.p. 136.5° .

Körner, Belasio, *Atti accad. Lincei*, 1908,
17, i, 680.

6-Iodo-*m*-nitroaniline.

Orange-yellow needles from EtOH. M.p.
 160.5° .

N-Acetyl: 6-iodo-3-nitroacetanilide. M.p. 199° .
Brenans, *Compt. rend.*, 1904, **138**, 1503.

2-Iodo-*p*-nitroaniline $C_6H_5O_2N_2I$

MW, 264

(i) Stable form. Yellowish-red cryst. M.p.
 115° (105°). (ii) Labile form. Yellow plates.

N - *Acetyl* : 2 - iodo - 4 - nitroacetanilide.
 $C_9H_7O_3N_2I$. MW, 306. M.p. 139° (128–30°).

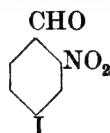
Körner, Contardi, *Atti accad. Lincei*, 1913,
 22, i, 824.

Bigiavi, Albanese, Poggi, *Gazz. chim. ital.*,
 1931, 61, 396.

Iodonitroanisole.

See under Iodonitrophenol.

4-Iodo-*o*-nitrobenzaldehyde



$C_7H_4O_3NI$

MW, 277

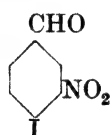
Cryst. from EtOH. M.p. 112°.

Semicarbazone : m.p. 284° decomp.

Sachs, D.R.P., 149,749, (*Chem. Zentr.*,
 1904, I, 909).

Kantorowicz, *Ber.*, 1906, 39, 2757.

4-Iodo-*m*-nitrobenzaldehyde



$C_7H_4O_3NI$

MW, 277

Yellow needles from hot EtOH. M.p. 141°.

Oxime : m.p. 157°.

p-Nitrophenylhydrazone : m.p. 277–8°.

Hodgson, Beard, *J. Chem. Soc.*, 1927, 25.

o-Iodonitrobenzene



$C_6H_4O_2NI$

MW, 249

Yellow needles. M.p. 54° (49.4°). B.p. 288–
 9°/729 mm., 162.5°/18 mm. Sol. EtOH, Et₂O.
 D^{25}_D 1.9186. Sublimes.

Holleman, *Rec. trav. chim.*, 1913, 32, 136.

Ullmann, *Ber.*, 1896, 29, 1880.

m-Iodonitrobenzene.

(i) Stable form. M.p. 38.5° (36–7°). B.p.
 153°/14 mm. D^{25}_D 1.9477. (ii) Labile form.
 M.p. 9.9°.

Brenans, *Bull. soc. chim.*, 1914, 15, 381.

van Arkel, *Rec. trav. chim.*, 1932, 51,
 1107.

Hasselblatt, *Z. physik. Chem.*, 1913, 83,
 13.

p-Iodonitrobenzene.

Yellow needles from EtOH. M.p. 174°
 (170–1°). B.p. 289°/772 mm.

Montagne, *Ber.*, 1918, 51, 1489.

Datta, Varma, *J. Am. Chem. Soc.*, 1919,
 41, 2047.

3-Iodo-*o*-nitrobenzoic Acid



$C_7H_4O_4NI$

MW, 293

M.p. 235°. Spar. sol. H₂O.

Et ester : $C_9H_8O_4NI$. MW, 321. M.p. 84°.

Grothe, *J. prakt. Chem.*, 1878, 18, 325.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42,
 500.

4-Iodo-*o*-nitrobenzoic Acid.

Prisms from dil. EtOH. M.p. 192°. Sol.
 EtOH, Et₂O, hot C₆H₆. Insol. H₂O.

Wheeler, Jones, *Am. Chem. J.*, 1910, 44,
 448.

5-Iodo-*o*-nitrobenzoic Acid.

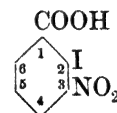
M.p. 174°. Sol. H₂O.

Et ester : $C_9H_8O_4NI$. MW, 321. M.p. 64°.

Grothe, *J. prakt. Chem.*, 1878, 18, 326.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42,
 500.

2-Iodo-*m*-nitrobenzoic Acid



$C_7H_4O_4NI$

MW, 293

M.p. 206° (204–205.5°).

Culhane, *Organic Syntheses*, 1927, VII, 12.

Whitmore, Culhane, *J. Am. Chem. Soc.*,
 1929, 51, 604.

4-Iodo-*m*-nitrobenzoic Acid.

Yellow prisms from EtOH. M.p. 213° (210°).
 Sol. EtOH. Spar. sol. H₂O.

Et ester : $C_9H_8O_4NI$. MW, 321. M.p. 88–
 89.5°.

Hodgson, Beard, *J. Chem. Soc.*, 1927, 25.

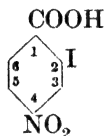
5-Iodo-*m*-nitrobenzoic Acid.

Prisms from pet. ether. M.p. 166–7°.

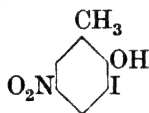
Et ester : m.p. 59–60°.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42,
 503.

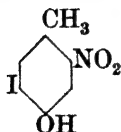
McAlister, Kenner, *J. Chem. Soc.*, 1928,
 1914.

6-Iodo-*m*-nitrobenzoic Acid.Needles from hot H₂O. M.p. 194° (197-8°).*Me ester*: C₈H₆O₄NI. MW, 307. M.p. 123°.*Et ester*: C₉H₈O₄NI. MW, 321. M.p. 98°.*Chloride*: C₇H₃O₃NCII. MW, 311.5. M.p. 83°.*Amide*: C₇H₅O₃N₂I. MW, 292. M.p. 231°.*Anilide*: m.p. 203°.Goldstein, Grampoloff, *Helv. Chim. Acta*, 1930, 13, 310.Joszt, Lesnianski, *Chem. Abstracts*, 1931, 25, 500.**2-Iodo-*p*-nitrobenzoic Acid**C₇H₄O₄NI

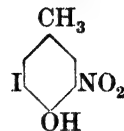
MW, 293

Yellow prisms from H₂O. M.p. 143°. Sol. EtOH, Et₂O. Spar. sol. ligroin, CCl₄, hot H₂O.*Me ester*: C₈H₆O₄NI. MW, 307. M.p. 89°.*Et ester*: C₉H₈O₄NI. MW, 321. M.p. 44°.*Chloride*: C₇H₃O₃NCII. MW, 311.5. B.p. 196°/18 mm.*Amide*: C₇H₅O₃N₂I. MW, 292. M.p. 205°.Wheeler, Johns, *Am. Chem. J.*, 1910, 44, 445.**3-Iodo-*p*-nitrobenzoic Acid.**Yellow cryst. M.p. 192°. Sol. H₂O.Grothe, *J. prakt. Chem.*, 1878, 18, 326.Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 500.**3-Iodo-5-nitro-*o*-cresol**C₇H₆O₃NI

MW, 279

Me ether: C₈H₆O₃NI. MW, 293. Cryst. from MeOH. Aq. M.p. 83°. Sol. ord. org. solvents.Robinson, *J. Chem. Soc.*, 1916, 109, 1085.**5-Iodo-2-nitro-*p*-cresol**C₇H₆O₃NI

MW, 279

Me ether: C₈H₆O₃NI. MW, 293. Needles from MeOH. M.p. 118°.Robinson, *J. Chem. Soc.*, 1916, 109, 1088.**5-Iodo-3-nitro-*p*-cresol**C₇H₆O₃NI

MW, 279

Yellow needles from AcOH. M.p. 83.5°.

NH₄ salt: m.p. 195-200°.Datta, Prosad, *J. Am. Chem. Soc.*, 1917, 39, 446.**2-Iodo-1-nitronaphthalene**C₁₀H₆O₂NI

MW, 299

Yellow needles from EtOH. M.p. 88.5° (81°). B.p. 172.5°/10 mm.

Meldola, *J. Chem. Soc.*, 1885, 47, 521.Willstaedt, Scheiber, *Ber.*, 1934, 67, 471.**3-Iodo-1-nitronaphthalene.**

Yellow needles from EtOH. M.p. 108°.

Cumming, Howe, *J. Chem. Soc.*, 1931, 3178.**4-Iodo-1-nitronaphthalene.**

Needles from EtOH. M.p. 123°.

Meldola, *J. Chem. Soc.*, 1885, 47, 519.**5-Iodo-1-nitronaphthalene.**Yellow needles from AcOH. M.p. 164°. Sol. C₆H₆, CHCl₃. Spar. sol. EtOH, AcOH.Scholl, *Monatsh.*, 1921, 42, 405.**1-Iodo-2-nitronaphthalene**C₁₀H₆O₂NI

MW, 299

Yellow plates from EtOH. M.p. 111° (108.5°).

Hodgson, Kilner, *J. Chem. Soc.*, 1926, 9.Meldola, *J. Chem. Soc.*, 1885, 47, 519.**3-Iodo-2-nitronaphthalene.**

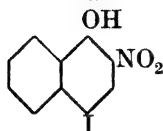
Greenish-yellow prisms from EtOH. M.p. 89-89.5°.

Cumming, Howie, *J. Chem. Soc.*, 1931, 3178.

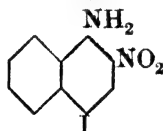
4-Iodo-2-nitronaphthalene.

Orange-yellow needles. M.p. 147°.

See previous reference.

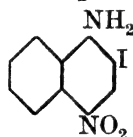
4-Iodo-2-nitro-1-naphthol $C_{10}H_6O_3NI$

MW, 315

Yellow needles from EtOH. M.p. 150° (145–6°). Sol. EtOH. Spar. sol. hot C_6H_6 .*Et ether*: $C_{12}H_{10}O_3NI$. MW, 343. M.p. 104–5°.Krynshi, *Chem. Abstracts*, 1928, **22**, 4120.
Meldola, *Streitfeld*, *J. Chem. Soc.*, 1895, 67, 913.**4-Iodo-2-nitro-1-naphthylamine** $C_{10}H_7O_2N_2I$

MW, 314

Orange needles. M.p. 192–3°.

Cumming, Howie, *J. Chem. Soc.*, 1931, 3177.**2-Iodo-4-nitro-1-naphthylamine** $C_{10}H_7O_2N_2I$

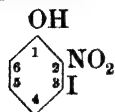
MW, 314

Yellowish-brown prisms from EtOH. M.p. 234°.

See previous reference.

Iodonitrophenetole.

See under Iodonitrophenol.

3-Iodo-*o*-nitrophenol $C_6H_4O_3NI$

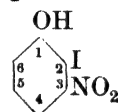
MW, 265

Greenish-yellow prisms from H_2O . M.p. 73.5°.*Me ether*: 3-iodo-*o*-nitroanisole. $C_7H_6O_3NI$. MW, 279. M.p. 82–3°.*Acetyl*: m.p. 102.5°.Hodgson, Moore, *J. Chem. Soc.*, 1927, 633.

Dist. of Org. Comp.—II.

4-Iodo-*o*-nitrophenol.Yellow needles from EtOH. M.p. 80–1°.
Volatile in steam.*Me ether*: 4-iodo-*o*-nitroanisole. M.p. 98°.*Et ether*: 4-iodo-*o*-nitrophenetole. $C_8H_8O_3NI$. MW, 293. M.p. 80°.*Benzoyl*: m.p. 102–3°.Roberts, *J. Chem. Soc.*, 1923, **123**, 2711.Robinson, *J. Chem. Soc.*, 1916, **109**, 1083.**5-Iodo-*o*-nitrophenol.**

Yellow needles from pet. ether. M.p. 96°.

Me ether: 5-iodo-*o*-nitroanisole. M.p. 92°.*Et ether*: 5-iodo-*o*-nitrophenetole. M.p. 86–7°.*Acetyl*: m.p. 95°.*Benzoyl*: m.p. 122°.Apostolo, *Gazz. chim. ital.*, 1921, **51**, ii, 396.Hodgson, Moore, *J. Chem. Soc.*, 1927, 632.**6-Iodo-*o*-nitrophenol.**M.p. 109–10° (110–11°). Sol. EtOH, Et_2O , hot H_2O . Volatile in steam.*Me ether*: 6-iodo-*o*-nitroanisole. M.p. 60–1°.*Acetyl*: m.p. 96–7°.Hodgson, Moore, *J. Chem. Soc.*, 1925, 2263.Keimatsu, *Chem. Abstracts*, 1924, **18**, 2504.**2-Iodo-*m*-nitrophenol** $C_6H_4O_3NI$

MW, 265

Yellow needles from AcOH. M.p. 134°.

 NH_4 salt: m.p. 165–70°.*Me ether*: 2-iodo-*m*-nitroanisole. $C_7H_6O_3NI$. MW, 279. M.p. 121–2°.Schlieper, *Ber.*, 1893, **26**, 2467.Datta, Prosad, *J. Am. Chem. Soc.*, 1917, **39**, 445.**4-Iodo-*m*-nitrophenol.**Yellow needles from H_2O . M.p. 156°.*Me ether*: 4-iodo-*m*-nitroanisole. M.p. 62°.*Et ether*: 4-iodo-*m*-nitrophenetole. $C_8H_8O_3NI$. MW, 293. M.p. 63.5°.*Acetyl*: m.p. 107.5°.Reverdin, *Ber.*, 1896, **29**, 2595.Hähle, *J. prakt. Chem.*, 1891, **43**, 72.**5-Iodo-*m*-nitrophenol.**Needles from H_2O . M.p. 136°.*Me ether*: 5-iodo-*m*-nitroanisole. M.p. 84°.

Acetyl: m.p. 110°.

Benzoyl: m.p. 100.5°.

Hodgson, Wignall, *J. Chem. Soc.*, 1926, 2077.

6-Iodo-*m*-nitrophenol.

Yellow needles from EtOH. M.p. 146–7°.

Me ether: 6-iodo-*m*-nitroanisole. M.p. 127–8°.

Meldola, Eyre, *Chem. Zentr.*, 1901, II, 97.

2-Iodo-*p*-nitrophenol



$C_6H_4O_3NI$

MW, 265

M.p. 94° (86–7°).

Me ether: 2-iodo-*p*-nitroanisole. $C_7H_6O_3NI$. MW, 279. M.p. 97°.

Et ether: 2-iodo-*p*-nitrophenetole. $C_8H_8O_3NI$. MW, 293. M.p. 96°.

Acetyl: m.p. 68°.

Hodgson, Moore, *J. Chem. Soc.*, 1925, 2264.

Keimatsu, *Chem. Abstracts*, 1924, 18, 2504.

Robinson, *J. Chem. Soc.*, 1916, 109, 1083.

3-Iodo-*p*-nitrophenol.

Yellow needles from pet. ether. M.p. 124°.

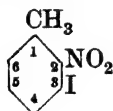
Me ether: 3-iodo-*p*-nitroanisole. M.p. 69–70°.

Acetyl: m.p. 73–7°.

Benzoyl: m.p. 119°.

Hodgson, Moore, *J. Chem. Soc.*, 1927, 632.

3-Iodo-*o*-nitrotoluene



$C_7H_6O_2NI$

MW, 263

Plates from pet. ether. M.p. 65°.

Wheeler, *Am. Chem. J.*, 1910, 44, 138.

4-Iodo-*o*-nitrotoluene.

Yellow cryst. from EtOH. M.p. 60.5–61°. B.p. 286° decomp. Sol. Et_2O , CS_2 .

Reverdin, Kacer, *Ber.*, 1897, 30, 3001.

Beilstein, Kuhlberg, Heynemann, *Ann.*, 1871, 158, 337.

5-Iodo-*o*-nitrotoluene.

Yellow prisms from EtOH. M.p. 77° (84°). Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. hot H_2O .

Artmann, *Monatsh.*, 1905, 26, 1096.

Wheeler, *Am. Chem. J.*, 1910, 44, 144.

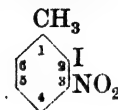
6-Iodo-*o*-nitrotoluene.

Yellowish cryst. M.p. 35.5° (34–6°).

Noelting, *Ber.*, 1904, 37, 1024.

Cohen, Miller, *J. Chem. Soc.*, 1904, 85, 1627.

2-Iodo-*m*-nitrotoluene



$C_7H_6O_2NI$

MW, 263

Yellow plates from EtOH. M.p. 67–8°.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 451.

4-Iodo-*m*-nitrotoluene.

Needles from EtOH. M.p. 55–6°. Sol. hot EtOH.

Beilstein, Kuhlberg, *Ann.*, 1871, 158, 344.

Wheeler, *Am. Chem. J.*, 1910, 44, 139.

6-Iodo-*m*-nitrotoluene.

Needles. M.p. 103–4°. Sol. hot EtOH.

Reverdin, Kacer, *Ber.*, 1897, 30, 3000.

Wheeler, *Am. Chem. J.*, 1910, 44, 130.

Datta, Varma, *J. Am. Chem. Soc.*, 1919, 41, 2047.

2-Iodo-*p*-nitrotoluene



$C_7H_6O_2NI$

MW, 263

M.p. 58° (54°). Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 , AcOH. Spar. sol. ligroin.

Blanksma, *Chem. Zentr.*, 1910, I, 261.

Willgerodt, Kok, *Ber.*, 1908, 41, 2077.

See also second reference above.

3-Iodo-*p*-nitrotoluene.

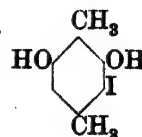
Orange-yellow needles. M.p. 95–7° (103–5° after resolidification).

Elson, Gibson, Johnson, *J. Chem. Soc.*, 1929, 2740.

Iodo-octane.

See Octyl iodide.

Iodo- β -orcinol (3-Iodo-2 : 6-dihydroxy-*p*-xylene)



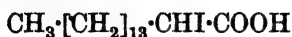
$C_8H_8O_2I$

MW, 264

Cryst. from ligroin. M.p. 93°. Very sol. CS₂, Et₂O, C₆H₆.

Stenhouse, Groves, *Ann.*, 1880, **203**, 298.

1-Iodopalmitic Acid



C₁₆H₃₁O₂I MW, 382

Glistening scales from pet. ether. M.p. 60–1°. Sol. warm EtOH, ligroin, CHCl₃.

Amide: C₁₆H₃₂ONI. MW, 381. Leaflets from EtOH. M.p. 108°. Sol. hot EtOH, C₆H₆, CHCl₃.

Jones, *J. Am. Chem. Soc.*, 1915, **37**, 589.

Ponzio, *Gazz. chim. ital.*, 1911, **41**, I, 784.

2-Iodopalmitic Acid



C₁₆H₃₁O₂I MW, 382

M.p. 50.5° (48–9°).

Robinet, *Bull. soc. chim. Belg.*, 1931, **40**, 710.

15-Iodopalmitic Acid



C₁₆H₃₁O₂I MW, 382

Cryst. M.p. 76°. Sol. hot EtOH.

Bougault, *Compt. rend.*, 1910, **150**, 876.

1-Iodo-n-pentane.

See n-Amyl iodide.

2-Iodo-n-pentane



C₅H₁₁I MW, 198

d.

B.p. 39°/20 mm. [α]_D¹⁷ +29.2° in Me₂CO.

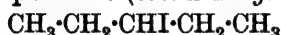
l.

B.p. 143°. D₄¹⁷ 1.5067. [α]_D¹⁷ –37.15°.

Bergmann, Polanyi, Szabo, *Z. physik.*

Chem., 1933, **B**, **20**, 170.

3-Iodo-n-pentane (sec.-n-Amyl iodide)



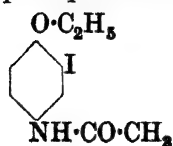
C₅H₁₁I MW, 198

B.p. 144°/738 mm., 68°/50 mm. D₄²⁰ 1.5176. n_D²⁰ 1.4968.

Wagner, Sayzeff, *Ann.*, 1875, **179**, 317.

Rosanow, *Chem. Zentr.*, 1923, I, 1491.

2-Iodophenacetin (2-Iodo-4-acetylaminophenetole, 2-iodo-p-acetphenetidide)



C₁₀H₁₂O₂NI

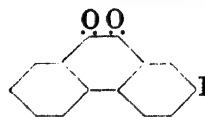
MW, 305 C₆H₅OI

Leaflets from EtOH.Aq. M.p. 146°. Sol. EtOH, CHCl₃, AcOH. Very spar. sol. H₂O. Insol. pet. ether.

Reverdin, *Ber.*, 1896, **29**, 2596.

Cohn, *Chem. Zentr.*, 1912, I, 996.

2-Iodophenanthraquinone



C₁₄H₇O₂I

MW, 334

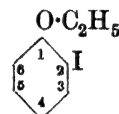
Orange cryst. from AcOH. M.p. 223–4°. Mod. sol. EtOH, C₆H₆, toluene.

McMaster, Wobus, *J. Am. Chem. Soc.*, 1934, **56**, 164.

Iodophenetidine.

See under Iodoaminophenol.

o-Iodophenetole



C₈H₉OI

MW, 248

Heavy oil. B.p. 245°/736 mm. Sol. ord. org. solvents. Volatile in steam. Cl in CHCl₃ → dichloride C₂H₅O·C₆H₄ICl₂, decomp. at 68°.

Reverdin, *Ber.*, 1896, **29**, 2596.

Jannasch, Naphtali, *Ber.*, 1898, **31**, 1714.

m-Iodophenetole.

B.p. 133–4°/15 mm.

Dichloride: m.p. 64° decomp. Unstable.

Buchan, McCombie, *J. Chem. Soc.*, 1932, 2857.

p-Iodophenetole.

Cryst. from MeOH.Aq. M.p. 29°. B.p. 249–50°/729 mm. Very sol. Et₂O, CHCl₃. Heat + Cu at 230–40° → 4:4'-diethoxydiphenyl. Cl or HOCl → golden-yellow cryst. dichloride, m.p. 73° (decomp. → 2-chloro-4-iodophenetole).

Reverdin, *Ber.*, 1896, **29**, 2596.

Matheson, McCombie, *J. Chem. Soc.*, 1931, 1106.

β-Iodophenetole.

See 2-Iodoethyl phenyl Ether.

o-Iodophenol



MW, 220

Needles. M.p. 43°. B.p. 186–7°/160 mm. Decomp. on dist. in air. D^{20}_D 1.8757. Very sol. EtOH, Et₂O, CS₂. Mod. sol. hot H₂O. Volatile in steam. Cold conc. H₂SO₄ → 2 : 4-di-iodophenol. With 1 mol. cincole forms cryst. comp., m.p. 89°.

Acetyl-dichloride : m.p. 92–3° decomp. Unstable.

Benzoyl : needles from pet. ether. M.p. 34°.

Dichloride : m.p. 98–101°. Unstable.

Phenylcarbamate : m.p. 122°.

Me ether : see o-Iodoanisole.

Et ether : see o-Iodophenetole.

Chi, *Chem. Abstracts*, 1932, **26**, 5552.

Buchan, McCombie, *J. Chem. Soc.*, 1931, 139.

Whitmore, Hanson, *Organic Syntheses*, Collective Vol. I, 319.

Hollemann, Rinkes, *Chem. Zentr.*, 1910, II, 304.

m-Iodophenol.

Needles from ligroin. M.p. 40°. Volatile in steam.

Acetyl : colourless plates from pet. ether. M.p. 38°. Dichloride : m.p. 91–2° decomp.

Benzoyl : prisms from pet. ether. M.p. 72–3°. Dichloride : m.p. 106° decomp. Stable.

p-Toluenesulphonyl : m.p. 60–1°. Dichloride : m.p. 97–9° decomp. Stable.

Dichloride : m.p. 91–2° decomp. Unstable.

Me ether : see m-Iodoanisole.

Et ether : see m-Iodophenetole.

Phenylurethane : m.p. 138°.

Buchan, McCombie, *J. Chem. Soc.*, 1932, 2858.

Ullmann, Loewenthal, *Ann.*, 1904, **332**, 66.

p-Iodophenol.

Flat needles from H₂O or by sublimation. M.p. 93–4°. Decomp. on dist. in air. D^{112}_D 1.8573. Sol. EtOH, Et₂O. Spar. sol. H₂O. Volatile in steam. Cold conc. H₂SO₄ → 2 : 4-di-iodophenol.

Carbonate : cryst. from CCl₄. M.p. 193°.

Phenylcarbamate : cryst. from C₆H₆. M.p. 148°.

p-Toluenesulphonyl : cryst. from MeOH. M.p. 99°. Dichloride : m.p. 115° decomp. Stable.

Me ether : see p-Iodoanisole.

Et ether : see p-Iodophenetole.

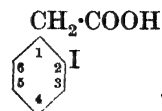
Birkenbach, Goubeau, *Ber.*, 1932, **65**, 399.

Chi, *Chem. Abstracts*, 1932, **26**, 5552.

Matheson, McCombie, *J. Chem. Soc.*, 1931, 1103.

Hollemann, Rinkes, *Chem. Zentr.*, 1910, II, 304.

o-Iodophenylacetic Acid



C₈H₇O₂I

MW, 262

Needles from H₂O. M.p. 110°. Sol. hot H₂O, EtOH, Et₂O, CS₂, ligroin. Spar. sol. cold H₂O.

Raum, *Ber.*, 1894, **27**, 3233.

p-Iodophenylacetic Acid.

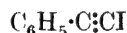
Plates from H₂O. M.p. 135°. Sol. hot H₂O, EtOH, Et₂O, C₆H₆, CS₂, AcOH. Mod. sol. cold H₂O.

Nitrile : p-iodobenzyl cyanide. C₈H₆NI. MW, 243. Plates from EtOH. M.p. 50–5°. Sol. EtOH, Et₂O, CS₂, C₆H₆, AcOH. Insol. H₂O.

Mabery, Jackson, *Ber.*, 1878, **11**, 56; *Am. Chem. J.*, 1880, **2**, 253.

Datta, Chatterjee, *J. Am. Chem. Soc.*, 1919, **41**, 295.

ω-Iodophenylacetylene



C₈H₅I

MW, 228

Colourless sweet-smelling oil. B.p. 134–8°/22 mm. slight decomp., 119°/20 mm., 115–17°/16 mm. D^{23}_D 1.75. Part. polymerizes on heating. Resinifies in sunlight. Dist. in vac. → tri-iodostyrene, C₆H₃·CI·CI₂. HI in cold AcOH → phenylacetylene di-iodide C₆H₅·CI·CHI. With 1 mol. aniline forms cryst. add. comp., m.p. 44°.

Peratoner, *Gazz. chim. ital.*, 1892, **22**, II, 81, 94.

Dehn, *Am. Chem. J.*, 1911, **33**, 1600.

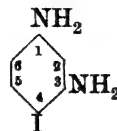
Manchot, *Ann.*, 1912, **387**, 292.

Truchet, *Ann. chim.*, 1931, **16**, 373.

Iodophenyl-α-alanine.

See 4-Iodo-α-aminohydrocinnamic Acid.

4-Iodo-m-phenylenediamine

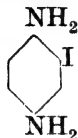


N : N'-Diacetyl : cryst. from C₆H₆ or CHCl₃. Decomp. at 175–8°.

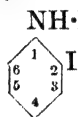
Nicolet, Sampey, *J. Am. Chem. Soc.*, 1927, **49**, 1799.

5-Iodo-*m*-phenylenediamine.

N : N'-Diacetyl : m.p. 291°.

Nicolet, *J. Am. Chem. Soc.*, 1927, **49**, 1813.**Iodo-*p*-phenylenediamine** $C_6H_7N_2I$ MW, 234Needles from H_2O . M.p. 110-5°.

N : N'-Diacetyl : cryst. from AcOH. M.p. 211-5°.

N : N'-Dibenzoyl : cryst. from $PhNO_2$. M.p. 254°.Nicolet, Ray, *J. Am. Chem. Soc.*, 1927, **49**, 1804.***o*-Iodophenylhydrazine** $C_6H_7N_2I$ MW, 234

Needles from pet. ether. M.p. 29-30°. Unstable. Condenses with benzaldehyde → cryst. comp., m.p. 66°.

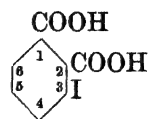
Votoček, Ettel, Koppova, *Bull. soc. chim.*, 1926, **39**, 281.Busch, Meussdörffer, *J. prakt. Chem.*, 1907, **75**, 139.***m*-Iodophenylhydrazine.**

Yellow oil. Decomp. on dist. Condenses with benzaldehyde → cryst. comp., m.p. 146-7°.

See first reference above.

p*-Iodophenylhydrazine.**Silky needles from H_2O . M.p. 103°. Sol. ord. org. solvents. Condenses with benzaldehyde → cryst. comp., m.p. 118°.Neufeld, *Ann.*, 1888, **248**, 98.Votoček, Ettel, Koppova, *Bull. soc. chim.*, 1926, **39**, 281.p*-Iodophenylurea** $C_7H_7ON_2I$ MW, 262

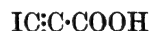
Colourless plates from hot EtOH. Does not melt below 300°.

Chattaway, Constable, *J. Chem. Soc.*, 1914, **105**, 131.**3-Iodophthalic Acid** $C_8H_5O_4I$ MW, 292Cryst. + $3H_2O$ from H_2O . M.p. 206°.*Di-Me ester* : $C_{10}H_9O_4I$. MW, 320. Prisms from pet. ether. M.p. 89°. Heat + Cu at 240-60° → tetramethyldiphenyl-2 : 3 : 2' : 3'-tetracarboxylic acid.*Di-Et ester* : $C_{12}H_{13}O_4I$. MW, 348. Leaflets. M.p. 70°.*Anhydride* : $C_8H_3O_3I$. MW, 274. Cryst. from Ac_2O . M.p. 159-61°.*Imide* : $C_8H_4O_2NI$. MW, 273. M.p. 238°. Sublimes in needles.Blicke, Smith, *J. Am. Chem. Soc.*, 1929, **51**, 1871.Kenner, Mathews, *J. Chem. Soc.*, 1914, **105**, 2477.**4-Iodophthalic Acid.**Cryst. + $1\frac{1}{2}H_2O$ from H_2O . M.p. 182° (185-6° sealed tube). Sublimes → anhydride.*Di-Me ester* : b.p. 219°. Heat + Cu at 240-60° → tetramethyldiphenyl-3 : 4 : 3' : 4'-tetracarboxylic acid.*Di-Et ester* : b.p. 235-8°. Very easily hyd. by alkalis.*Anhydride* : cryst. from Ac_2O . M.p. 125-6°.*Imide* : m.p. 222-4°.Datta, Chatterjee, *J. Am. Chem. Soc.*, 1919, **41**, 294.Willgerodt, *Ber.*, 1896, **29**, 1575.

See also previous references.

Iodopropane.

See Propyl iodide and Isopropyl iodide.

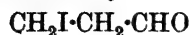
Iodopropiolic Acid (*Iodopropargylic acid*, *iodopropinic acid*). C_3HO_2I MW, 196Prisms from Et_2O or C_6H_6 . M.p. 142° (140°). Decomp. above m.p. or on standing.*Et ester* : $C_5H_5O_2I$. MW, 224. Prisms from Et_2O . M.p. 68°.Baeyer, *Ber.*, 1885, **18**, 2274.Nef, *Ann.*, 1899, **308**, 325.**1-Iodopropionaldehyde** C_3H_5OI MW, 184

Lachrymatory oil with strong odour. B.p. 83–4°/17 mm. (40°/15 mm.). Insol. H_2O .

Nef, *Ann.*, 1904, **335**, 266.

Dawson, Marshall, *J. Chem. Soc.*, 1914, **105**, 387.

2-Iodopropionaldehyde



$\text{C}_3\text{H}_5\text{OI}$ MW, 184

Di-Me acetal: $\text{C}_5\text{H}_{11}\text{O}_2\text{I}$. MW, 230. B.p. 85°/60 mm. Stable.

Wohl, *Ber.*, 1908, **41**, 3604.

1-Iodopropionic Acid



$\text{C}_3\text{H}_5\text{O}_2\text{I}$ MW, 200

d.

B.p. 75–100°/12–22 mm. $[\alpha]_D^{17} + 50.7^\circ$ in Et_2O .

Me ester: $\text{C}_4\text{H}_7\text{O}_2\text{I}$. MW, 214. $[\alpha]_{578} + 87.5^\circ$ in hexane.

Chloride: $\text{C}_3\text{H}_4\text{OClI}$. MW, 218.5. B.p. 44–5°/12 mm. $[\alpha]_{578} + 54.3^\circ$.

Amide: $\text{C}_3\text{H}_6\text{ONI}$. MW, 199. Cryst. from $\text{Me}_2\text{CO}-\text{C}_6\text{H}_6$. M.p. 155.5–157° decomp. $[\alpha]_D + 20.4^\circ$ in EtOH.

l.

$[\alpha]_D^{17} - 49.9^\circ$ in Et_2O .

Anilide: plates from EtOH. M.p. 134–6°. $[\alpha]_D - 143^\circ$ in EtOH.

dl.

Needles from pet. ether. M.p. 45°. Decomp. in light. $k = 6.19 \times 10^{-4}$ at 25°.

Et ester: $\text{C}_5\text{H}_9\text{O}_2\text{I}$. MW, 228. B.p. 85°/38 mm. $D_4^{17} 1.662$.

Chloride: b.p. 51–3°/13 mm. $D_4^{25} 1.989$.

Amide: $\text{C}_3\text{H}_6\text{ONI}$. MW, 199. Needles from toluene. M.p. 160° (156–7°, sinters at 153°). Spar. sol. C_6H_6 , cold H_2O .

Anilide: needles from EtOH. M.p. 131–2°.

Freudenberg, Kuhn, Bumann, *Ber.*, 1930, **63**, 2388.

Backer, Mels, *Rec. trav. chim.*, 1930, **49**, 181.

Jacobs, Heidelberger, *J. Biol. Chem.*, 1915, **21**, 146.

Hannerz, *Ber.*, 1926, **59**, 1367.

2-Iodopropionic Acid



$\text{C}_3\text{H}_5\text{O}_2\text{I}$ MW, 200

Glittering leaflets from H_2O . M.p. 85° (82°). Very sol. EtOH, Et_2O . Sol. hot H_2O . Very spar. sol. cold H_2O . $k = 9 \times 10^{-5}$ at 25°.

Me ester: $\text{C}_4\text{H}_7\text{O}_2\text{I}$. MW, 214. B.p. 188°/756 mm. $D_4^{17} 1.8408$.

Et ester: $\text{C}_5\text{H}_9\text{O}_2\text{I}$. MW, 228. B.p. 202° slight decomp., 136°/100 mm., 85°/13 mm., 80°/9 mm.

Isoamyl ester: $\text{C}_8\text{H}_{10}\text{O}_2\text{I}$. MW, 265. B.p. 183°/140 mm. slight decomp.

Chloride: $\text{C}_3\text{H}_4\text{OClI}$. MW, 218.5. B.p. 81°/15 mm.

Amide: $\text{C}_3\text{H}_6\text{ONI}$. MW, 199. Plates from C_6H_6 . M.p. 142° (100–1°). Mod. sol. cold H_2O . Spar. sol. C_6H_6 .

King, L'Ecuyer, *J. Chem. Soc.*, 1934, 1903.

Silberrad, *J. Chem. Soc.*, 1904, **85**, 611.

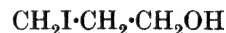
Perkin, *ibid.*, 422 (Footnote).

Wöhlk, *J. prakt. Chem.*, 1900, **61**, 210.

Meyer, *Ber.*, 1888, **21**, 24.

See also last two references above.

3-Iodopropyl Alcohol (Trimethylene iodohydrin)



$\text{C}_3\text{H}_7\text{OI}$ MW, 186

Viscous liq. Decomp. in light. B.p. 115°/38 mm., 88°/4 mm. $D_4^{20} 1.9976$. $n_D^{20} 1.55854$.

Me ether: methyl 3-iodopropyl ether. $\text{C}_4\text{H}_9\text{OI}$. MW, 200. B.p. 158°. $D_4^{20} 1.6788$.

Et ether: ethyl 3-iodopropyl ether. $\text{C}_5\text{H}_{11}\text{OI}$. MW, 214. B.p. 172.5°/779 mm. $D_4^{20} 1.5464$. $n_D^{20} 1.49123$.

Karvonen, *Chem. Abstracts*, 1920, **14**, 2176; *Chem. Zentr.*, 1912, II, 1271.

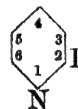
Iodopropylene.

See Allyl iodide and Isopropenyl iodide.

3-Iodopropylene Glycol.

See under Glycerol.

2-Iodopyridine (α -Iodopyridine)



$\text{C}_5\text{H}_4\text{NI}$ MW, 205

B.p. 93°/13 mm. $D_4^{20} 1.9735$. $n_D^{20} 1.6366$.

$\text{B}_2\text{H}_2\text{PtCl}_6$: red needles. M.p. 210° decomp. *Methiodide*: needles from H_2O . M.p. 207° decomp.

Picrate: m.p. 119–20°.

Tschitschibabin, Rjazancev, *J. Russ.*

Phys. Chem. Soc., 1915, **46**, 1571 (*J.*

Chem. Soc. Abstracts, 1916, **110**, I, 224).

Fischer, *Ber.*, 1899, **32**, 1300.

3-Iodopyridine (β -Iodopyridine).

Cryst. from EtOH.Aq. M.p. 53.5° (50°). Very volatile at room temp. Sol. ord. org. solvents. Spar. sol. H_2O . Cl in ice-cold $CHCl_3 \rightarrow$ *chloride*: yellow needles, m.p. $128-30^\circ$.

$B_2H_2PtCl_6$: m.p. 211° decomp.

Baumgarten, *Ber.*, 1925, **58**, 2023.

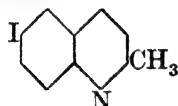
Binz, R  th, *Ann.*, 1931, **486**, 101; E.Ps., 259,997, 251,578, (*Chem. Abstracts*, 1927, **21**, 3370, 1332).

(*Cf.* Schering-Kahlbaum, D.R.Ps., 511,451, 468,302, (*Chem. Abstracts*, 1931, **25**, 523; 1929, **23**, 612).

4-Iodopyridine (γ -Iodopyridine).

Granular cryst. M.p. 100° decomp. Volatile in steam.

Haitinger, Lieben, *Monatsh.*, 1885, **6**, 319.

6-Iodoquinaldine (6-Iodo-2-methylquinoline)

$C_{10}H_8NI$ MW, 269

Needles from EtOH.Aq. M.p. $107-8^\circ$.

Picrate: yellow leaflets from EtOH. M.p. $194-5^\circ$.

Borsche, Weussmann, Fritzsche, *Ber.*, 1924, **57**, 1772.

2-Iodoquinoline

C_9H_8NI MW, 255

Needles from EtOH.Aq. M.p. $52-3^\circ$. Decomp. on dist. Sol. ord. org. solvents. Spar. sol. H_2O .

Methiodide: yellow needles. M.p. $211-12^\circ$.

Ethiodide: brown needles. M.p. 220° .

Friedl  nder, Weinberg, *Ber.*, 1885, **18**, 1531.

Roser, *Ann.*, 1894, **282**, 376.

4-Iodoquinoline.

Needles. M.p. 97° . Sol. EtOH, Et_2O . Insol. cold H_2O . Volatile in steam.

$B_2H_2PtCl_6$: orange needles from HCl.Aq. Decomp. at 185° .

Methiodide: reddish-yellow needles from H_2O . M.p. 251° decomp. Very spar. sol. cold H_2O .

Claus, Frobenius, *J. prakt. Chem.*, 1897, **56**, 193.

5-Iodoquinoline.

Small glittering needles from EtOH or Et_2O . M.p. 100° . Sol. ord. org. solvents. Spar. sol. hot H_2O . Sublimes. Volatile in steam.

B_2H_2Cl : m.p. 235° (darkens).

$B_2H_2CrO_4$: m.p. 165° decomp.

$B_2H_2PtCl_6$: bright yellow cryst. M.p. 263° decomp.

Methiodide: golden-yellow needles. M.p. 245° decomp.

Claus, Grau, *J. prakt. Chem.*, 1893, **48**, 167.

6-Iodoquinoline.

Pearly leaflets from H_2O . M.p. 91° (88°). Sol. hot H_2O , ord. org. solvents. Sublimes. Volatile in steam.

B_2H_2Cl : m.p. 210° .

$B_2H_2PtCl_6$: reddish-yellow needles. M.p. 265° decomp.

Methiodide: golden-yellow rods from H_2O . M.p. above 300° .

See previous reference.

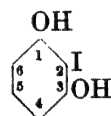
8-Iodoquinoline.

Long needles from EtOH. M.p. 36° . Very sol. ord. org. solvents. Mod. sol. ligroin.

$B_2H_2PtCl_6$: fine needles + $2H_2O$ from alc. HCl. M.p. 251° .

Methiodide: small yellow needles from hot H_2O . M.p. 200° .

Howitz, Fraenkel, Schroeder, *Ann.*, 1913, **396**, 57.

2-Iodoresorcinol

$C_6H_5O_2I$ MW, 236

Di-Me ether: $C_8H_9O_2I$. MW, 264. Needles from EtOH. M.p. 103° .

Baeyer, *Ann.*, 1910, **372**, 127.

Kauffmann, Franck, *Ber.*, 1907, **40**, 4014.

4-Iodoresorcinol.

Prisms from hot H_2O . M.p. 67° . Decomp. above m.p.

Di-Me ether: cryst. from ligroin. M.p. 40° . B.p. $163^\circ/14$ mm.

Nicolet, Sampey, *J. Am. Chem. Soc.*, 1927, **49**, 1798.

Kauffmann, Kieser, *Ber.*, 1912, **45**, 2334.

5-Iodoresorcinol.

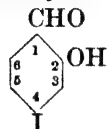
Needles + $1H_2O$ from C_6H_6 . M.p. 92.3° .

Sublimes in vacuo \rightarrow needles, m.p. 105–13° (hydrated).

1-*Me ether*: 5-iodo-3-hydroxyanisole. $C_7H_7O_2I$. MW, 250. Sublimes in colourless needles. M.p. 90°.

Hodgson, Wignall, *J. Chem. Soc.*, 1926, 2826.

4-Iodosalicylaldehyde



$C_7H_5O_2I$

MW, 248

Long needles from EtOH or dil. AcOH. M.p. 87°. Volatile in steam. $HNO_3 \rightarrow$ 5-nitro deriv.

Benzoyl: m.p. 62°.

Me ether: 4-iodo-2-methoxybenzaldehyde. Needles from EtOH. M.p. 85°. *Oxime*: m.p. 138°. *Semicarbazone*: m.p. 228°. *p-Nitrophenylhydrazone*: m.p. 238° decomp.

Oxime: m.p. 171°.

Semicarbazone: m.p. 252°.

p-Nitrophenylhydrazone: m.p. 242° decomp.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3043.

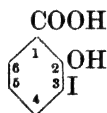
5-Iodosalicylaldehyde.

Pale yellow needles from EtOH. M.p. 102°. $FeCl_3$ on EtOH sol. \rightarrow blue col.

Oxime: needles from EtOH. M.p. 135°.

Visser, *Arch. Pharm.*, 1897, 235, 558, (*J. Chem. Soc. Abstracts*, 1898, 74, I, 202).

3-Iodosalicylic Acid



$C_7H_5O_3I$

MW, 264

Long fine needles from H_2O . M.p. 199°. $FeCl_3 \rightarrow$ violet col.

Brenans, Prost, *Compt. rend.*, 1924, 178, 1824; 1923, 176, 1626.

Dimroth, *Ber.*, 1902, 35, 2873.

4-Iodosalicylic Acid.

M.p. 230° decomp. $FeCl_3 \rightarrow$ reddish-violet col. *Acetyl*: 4-iodoaspirin. $C_9H_7O_4I$. MW, 306.

M.p. 156°.

Et ester: $C_9H_9O_3I$. MW, 292. M.p. 21°. Volatile in steam.

Me ether: 4-iodo-2-methoxybenzoic acid.

$C_8H_7O_3I$. MW, 278. M.p. 150°. Decomp. above m.p. Sublimes at 120–30°.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3041.

Brenans, Prost, *Compt. rend.*, 1924, 178, 1010.

5-Iodosalicylic Acid.

Needles from H_2O . M.p. 197° (193.5°). Sol. EtOH. Spar. sol. H_2O . Heat of comb. C_9 706.5 Cal. $FeCl_3 \rightarrow$ violet col. Rapid heat \rightarrow *p*-iodophenol. KOH fusion \rightarrow 2:5-dihydroxybenzoic acid.

Acetyl: 5-iodoaspirin. M.p. 166°. *Nitrile*: $C_9H_6O_2NI$. MW, 287. Plates. M.p. 79°.

Et ester: needles. M.p. 70–1°. Decomp. on dist.

Glycerol α -mono-ester: m.p. 105°.

p-Nitrobenzyl ester: m.p. 141°.

Miller, *Ann.*, 1883, 220, 123.

Visser, *Arch. Pharm.*, 1897, 235, 559 (*J. Chem. Soc. Abstracts*, 1898, 74, I, 203).

Haase, D.R.P., 224,536, (*Chem. Abstracts*, 1911, 5, 155).

Brenans, Prost, *Compt. rend.*, 1923, 176, 1626; 1924, 178, 1824.

Iodosobenzene

C_6H_5IO

C_6H_5OI

MW, 220

Yellow amorphous powder. Explodes at 210°. Mod. sol. hot H_2O , EtOH. Insol. Et_2O , Me_2CO , C_6H_6 , pet. ether. Decomp. slowly on standing, rapidly at 90–100° \rightarrow $C_6H_5I + C_6H_5IO_2$.

Diacetate: $C_6H_5I(O\cdot CO\cdot CH_3)_2$. M.p. 160.5° (157°).

Dipropionate: $C_6H_5I(O\cdot CO\cdot C_2H_5)_2$. Cryst. from ligroin. M.p. 67–70°.

Dibenzoate: $C_6H_5I(O\cdot CO\cdot C_6H_5)_2$. M.p. 159–60°.

Sidgwick, Barkworth, *J. Chem. Soc.*, 1931, 808.

Arbuzov, *J. prakt. Chem.*, 1931, 131, 357.

Ortoleva, *Gazz. chim. ital.*, 1900, 30, II, 3.

Iodosol.

See 6-Iodothymol.

1-Iodostearic Acid

$CH_3[CH_2]_{15}\cdot CHI\cdot COOH$

$C_{18}H_{35}O_2I$

MW, 410

Leaflets. M.p. 66°. Sol. warm EtOH, warm pet. ether.

Amide: $C_{18}H_{36}ONI$. MW, 409. Leaflets from EtOH. M.p. 112°.

Ponzio, *Gazz. chim. ital.*, 1911, 41, I, 786; 1904, 34, II, 80.

2-Iodostearic Acid



$\text{C}_{18}\text{H}_{35}\text{O}_2\text{I}$ MW, 410

Needles from AcOH. M.p. 60–1°. Sol. EtOH, CHCl_3 , C_6H_6 . Spar. sol. Et_2O , pet. ether.

Me ester: $\text{C}_{19}\text{H}_{37}\text{O}_2\text{I}$. MW, 424. Needles. M.p. 44° (41°).

Eckert, Halla, *Monatsh.*, 1913, **34**, 1817.

3-Iodostearic Acid



$\text{C}_{18}\text{H}_{35}\text{O}_2\text{I}$ MW, 410

Needles from AcOH. M.p. 58.5°. Easily hyd. by alkalis with elimination of iodine.

See previous reference.

9-Iodostearic Acid



$\text{C}_{18}\text{H}_{35}\text{O}_2\text{I}$ MW, 410

Thick oil. Alc. KOH \rightarrow oleic + isoleic acids

Siazew, *J. prakt. Chem.*, 1887, **35**, 378; 1886, **33**, 308.

10-Iodostearic Acid

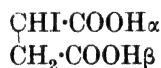


$\text{C}_{18}\text{H}_{35}\text{O}_2\text{I}$ MW, 410

Thick oil. Alc. KOH \rightarrow only isoleic acid (m.p. 44°).

Siazew, *J. prakt. Chem.*, 1888, **37**, 276.

Iodosuccinic Acid



$\text{C}_4\text{H}_5\text{O}_4\text{I}$ MW, 244

l.

Cryst. from $\text{AcOEt} \cdot \text{CCl}_4$. M.p. 150–2° decomp. $[\alpha]_D^{20} = 89.8^\circ$ in AcOEt. Quickly racemised by NaI in H_2O or Me_2CO .

dl.

Cryst. from $\text{AcOEt} \cdot \text{C}_6\text{H}_6$. M.p. 135–40° decomp. Very sol. H_2O , EtOH, Et_2O , AcOEt. Spar. sol. C_6H_6 . The freshly prepared H_2O sol. + $\text{AgNO}_3 \rightarrow \text{AgI}$ after short time.

β -*Monoamide*: iodosuccinamic acid. $\text{C}_4\text{H}_6\text{O}_3\text{NI}$. MW, 243. Prisms. M.p. 118–20° decomp. Sol. H_2O , EtOH, Me_2CO , AcOEt. Spar. sol. Et_2O . Insol. C_6H_6 , CHCl_3 .

Holmberg, *Arkiv. Kemi, Mineral. Geol.*, 1917, **6**, 23; *J. prakt. Chem.*, 1913, **88**, 576.

Kallenberg, *Ber.*, 1917, **50**, 94.

Westerlund, *Ber.*, 1915, **48**, 1179.

Iodoterephthalic Acid



$\text{C}_8\text{H}_5\text{O}_4\text{I}$

MW, 292

Yellow needles from hot EtOH. Aq. M.p. 274–6°. Sublimes undecomp.

4-Me ester: $\text{C}_9\text{H}_7\text{O}_4\text{I}$. MW, 306. M.p. 186°.

Di-Me ester: $\text{C}_{10}\text{H}_9\text{O}_4\text{I}$. MW, 320. Yellow needles from H_2O . M.p. 80°. Heat (+ Cu) \rightarrow tetramethyldiphenyl-2 : 5 : 2' : 5'-tetracarb-oxylic acid, m.p. 156°.

Abbes, *Ber.*, 1893, **26**, 2951.

Kenner, Witham, *J. Chem. Soc.*, 1913, **103**, 237.

Iodotetracosane.

See Tetracosyl iodide.

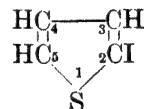
Iodothioanisole.

See under Iodothiophenol.

Iodothione.

1 : 3-Di-iodoisopropyl Alcohol, *q.v.*

2-Iodothiophene



$\text{C}_4\text{H}_3\text{IS}$

MW, 210

B.p. 90–4°/34–8 mm., 80–1°/20 mm., 73°/15 mm. $\text{HgCl}_2 \cdot \text{Aq} + \text{AcONa}$ in EtOH \rightarrow after 3 weeks felt-like cryst., $\text{IC}_4\text{H}_2\text{S} \cdot \text{HgCl}$, m.p. 225° (sinters at 215°).

Minnis, *Organic Syntheses*, 1932, **XII**, 44.

Steinkopf, Bauermeister, *Ann.*, 1914, **403**, 68.

3-Iodothiophene.

B.p. 77°/11 mm.

Rinkes, *Rec. trav. chim.*, 1934, **53**, 644, 648.

Iodothiophenetole.

See under Iodothiophenol.

o-Iodothiophenol



$\text{C}_6\text{H}_5\text{IS}$

MW, 236

Me ether: o-iodothioanisole. $\text{C}_7\text{H}_7\text{IS}$. MW, 250. Yellow oil. B.p. 173°/20 mm. Volatile in steam. Sol. ord. org. solvents.

Zincke, Siebert, *Ber.*, 1915, **48**, 1247.

m-Iodothiophenol.

Me ether: m-iodothioanisole. Colourless oil. B.p. 157°/16 mm. Volatile in steam. Sol. ord. org. solvents.

Zincke, Müller, *Ber.*, 1913, **46**, 783.

p-Iodothiophenol.

Needles from EtOH. M.p. 85–6°. Sol. EtOH, Et₂O, CHCl₃.

Me ether: p-iodothioanisole. Leaflets from MeOH. M.p. 45° (38°). Insol. H₂O.

Et ether: p-iodothiophenetole. C₈H₉IS. MW, 264. Yellow oil. B.p. 146–7°/11 mm. CrO₃ in AcOH \rightarrow sulphone, m.p. 83°.

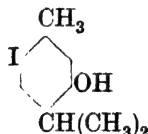
Monier-Williams, *J. Chem. Soc.*, 1906, **89**, 278.

Zincke, Jörg, *Ber.*, 1910, **43**, 3448.

Gattermann, *Ann.*, 1912, **393**, 232.

Willgerodt, Klinger, *J. prakt. Chem.*, 1912, **85**, 189.

6-Iodothymol (Iodosol)



C₁₀H₁₃OI

MW, 276

Needles from EtOH. M.p. 68–9°. Sol. ord. org. solvents. Spar. sol. warm H₂O. Insol. cold H₂O. MnO₂ + H₂SO₄ or FeCl₃.Aq. \rightarrow thymoquinone.

Acetyl: needles from AcOH. M.p. 71°. Sol. ord. org. solvents.

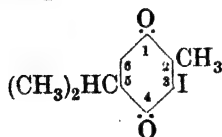
Et ether: C₁₂H₁₇OI. MW, 304. M.p. 52°. Sol. Et₂O, CHCl₃, AcOH, ligroin. Mod. sol. hot H₂O, hot EtOH.

Picryl ether: cryst. from AcOH. M.p. 155°.

Datta, Prasad, *J. Am. Chem. Soc.*, 1917, **39**, 444.

Kalle, D.R.P., 107,509, (*Chem. Zentr.*, 1900, I, 1087).

3-Iodothymoquinone



C₁₀H₁₁O₂I

MW, 290

Yellowish-red prisms from 95% EtOH or ligroin. M.p. 61–2°. Difficultly volatile in steam. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Very spar. sol. hot H₂O.

Oxime: golden-yellow prisms or needles from

EtOH.Aq. M.p. 130° decomp. (rapid heat.). Sol. EtOH, Et₂O. *Acetyl*: m.p. 67–8°.

Kehrmann, Krüger, *Ann.*, 1900, **310**, 100.

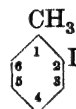
6-Iodothymoquinone.

Reddish plates from EtOH or ligroin. M.p. 64–5°. Mod. volatile in steam. Sol. EtOH, Et₂O, AcOH, ligroin, C₆H₆. Insol. H₂O.

Oxime: golden-yellow plates from EtOH. Decomp. 141–2°. *Acetyl*: m.p. 99–100°.

Kehrmann, Krüger, *Ann.*, 1900, **310**, 93.

***o*-Iodotoluene**



C₇H₇I

MW, 218

B.p. 211° (204°), 207°/726 mm. D₂₀ 1.698. Dil. HNO₃ \rightarrow *o*-iodobenzoic acid.

Shoesmith, Slater, *J. Chem. Soc.*, 1924, **125**, 2282.

Birkenbach, Goubeau, *Ber.*, 1932, **65**, 399.

Datta, *J. Am. Chem. Soc.*, 1919, **41**, 290.

Elbs, Jaroslawzew, *J. prakt. Chem.*, 1913, **88**, 92.

Ullmann, Meyer, *Ann.*, 1904, **332**, 42.

***m*-Iodotoluene.**

B.p. 213° (204°). D₂₀ 1.698.

Beilstein, Kuhlberg, *Ann.*, 1871, **158**, 347.

Datta, *J. Am. Chem. Soc.*, 1919, **41**, 290.

See also first reference above.

***p*-Iodotoluene.**

Leaflets. M.p. 36–7° (35°). B.p. 211° (213.5°/733 mm.). Sublimes. Volatile in steam. Sol. EtOH, Et₂O, CS₂. Dil. HNO₃ \rightarrow *p*-iodobenzoic acid.

Bodroux, *Compt. rend.*, 1902, **135**, 1351.

Edinger, Goldberg, *Ber.*, 1900, **33**, 2877.

Gattermann, *Ber.*, 1890, **23**, 1223.

Datta, *J. Am. Chem. Soc.*, 1919, **41**, 290.

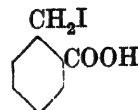
Ullmann, Meyer, *Ann.*, 1904, **332**, 42.

See also first two references above.

ω -Iodotoluene.

See Benzyl iodide.

ω -Iodo-*o*-toluic Acid (*o*-Carboxybenzyl iodide)

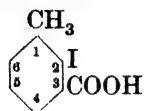


C₈H₇O₂I

MW, 262

Et ester: $C_{10}H_{11}O_2I$. MW, 290. Minute needles. M.p. 32.5° . Sol. ord. org. solvents. Decomp. slowly on keeping.

Davies, Perkin, *J. Chem. Soc.*, 1922, 121, 2208.

2-Iodo-*m*-toluic Acid

$C_8H_7O_2I$ MW, 262

Needles from C_6H_6 or MeOH. M.p. $145-6^\circ$ (softens at 135°).

Me ester: $C_9H_9O_2I$. MW, 276. B.p. $280-90^\circ$.

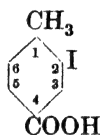
Mayer, *Ber.*, 1911, 44, 2303.

4-Iodo-*m*-toluic Acid.

Cryst. from dil. AcOH. M.p. $214-15^\circ$. $KMnO_4 \rightarrow$ 4-iodoisophthalic acid.

Willgerodt, Jahn, *Ann.*, 1911, 385, 328.

Edinger, Goldberg, *Ber.*, 1900, 33, 2879.

2-Iodo-*p*-toluic Acid

$C_8H_7O_2I$ MW, 262

Cryst. from EtOH. M.p. $205-6^\circ$.

Me ester: cryst. M.p. 28° . B.p. $194^\circ/52$ mm.

Et ester: $C_{10}H_{11}O_2I$. MW, 290. B.p. $242^\circ/175$ mm.

Amide: C_8H_8ONI . MW, 261. Leaflets from EtOH. M.p. 167° .

Dichloride: $CH_3 \cdot C_6H_3ICl_2 \cdot COOH$. M.p. $193-5^\circ$.

Nitrile: C_8H_6NI . MW, 243. Cryst. from AcOEt. M.p. 57.5° .

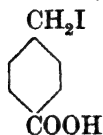
Kenner, Witham, *J. Chem. Soc.*, 1913, 103, 235.

3-Iodo-*p*-toluic Acid.

Needles from H_2O . M.p. 127° . Very sol. $CHCl_3$.

Klöppel, *Ber.*, 1893, 26, 1737.

ω -Iodo-*p*-toluic Acid (p-Carboxybenzyl iodide)

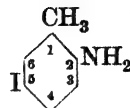


$C_8H_7O_2I$

MW, 262

Nitrile: p-cyanobenzyl iodide. C_8H_6NI . MW, 243. Needles from EtOH. M.p. $143-4^\circ$.

Freund, Reitz, *Ber.*, 1906, 39, 2235.

5-Iodo-*o*-toluidine

C_7H_8NI

MW, 233

Needles from 50% EtOH. M.p. 87.2° (92° , 85°). Volatile in steam. Sol. EtOH, Et_2O , AcOH, C_6H_6 , ligroin, hot H_2O .

B,4HF: m.p. 105° .

B,HCl: m.p. 214° .

B,HBr: m.p. 196° .

B,HI: m.p. 190° .

B,HClO4: m.p. 209° .

B2,(COOH)2: m.p. 158° .

N-Acetyl: 5-iodoacet-*o*-toluidide. Needles from dil. EtOH. M.p. 170.5° ($161-2^\circ$).

N-Benzoyl: needles from EtOH. M.p. 184° .

N-Benzylidene: needles. M.p. 55° .

B2,HgCl2: m.p. 134.5° .

Phenylurethane: m.p. 232° .

Picrate: m.p. 188.5° .

Picrolonate: m.p. 189.5° .

Hahn, Berliner, *J. Am. Chem. Soc.*, 1925, 47, 1709.

Schrauth, Schoeller, *Ber.*, 1912, 45, 2818.

6-Iodo-*o*-toluidine.

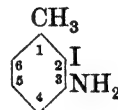
Oil. Volatile in steam.

B,HCl: plates. M.p. 254° decomp.

N-Acetyl: 6-iodoacet-*o*-toluidide. Needles. M.p. 166° .

Cohen, Miller, *J. Chem. Soc.*, 1904, 85, 1627.

Noelting, *Ber.*, 1904, 37, 1024.

2-Iodo-*m*-toluidine

C_7H_8NI

MW, 233

Prisms. M.p. $41-2^\circ$. Sol. EtOH, Et_2O . Insol. H_2O .

N-Acetyl: 2-iodoacet-*m*-toluidide. Needles from H_2O . M.p. 135° . Sublimes. Sol. EtOH.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 452.

4-Iodo-*m*-toluidine.

Cryst. from dil. EtOH. M.p. 48° (38.5°). Discolours in light. Decomp. on steam dist.

B, HCl: decomp. at 155°.

*B*₂(*COOH*)₂: needles. M.p. 113°.

N-Formyl: needles. M.p. 129°.

N-Acetyl: 4-iodoacet-*m*-toluidide. Prisms from EtOH. M.p. 151° (145-6°). Hyd. with difficulty.

Willgerodt, Simonis, *Ber.*, 1906, **39**, 273.

Wheeler, *Am. Chem. J.*, 1910, **44**, 139.

5-Iodo-*m*-toluidine.

Needles from pet. ether. M.p. 78.5°.

N-Acetyl: 5-iodoacet-*m*-toluidide. Plates from EtOH. M.p. 183°.

Wheeler, *Am. Chem. J.*, 1910, **44**, 145.

6-Iodo-*m*-toluidine.

Plates from EtOH. M.p. 46° (42°). Very sol. AcOH, C₆H₆, ligroin. Sol. EtOH, Et₂O. Spar. sol. hot H₂O. Resinifies in air.

N-Acetyl: 6-iodoacet-*m*-toluidide. Needles from EtOH. M.p. 147-8° (132-4°).

Hollemann, Linden, *Rec. trav. chim.*, 1912, **31**, 270.

Wheeler, *Am. Chem. J.*, 1910, **44**, 128.

2-Iodo-*p*-toluidine



C₇H₈NI

MW, 233

Needles from dil. EtOH or pet. ether. M.p. 37-8°. Sol. ord. org. solvents. Stable to light. Salts decomp. by cold H₂O.

N-Acetyl: 2-iodoacet-*p*-toluidide. Needles from dil. EtOH, M.p. 130°. *Dichloride*: CH₃·C₆H₃ICl₂·NH₂. Yellow needles. Decomp. at 100°.

Oxalate: m.p. 103° decomp.

Willgerodt, Gartner, *Ber.*, 1908, **41**, 2813.

Blanksma, *Chem. Zentr.*, 1910, **I**, 261.

3-Iodo-*p*-toluidine.

Prisms. M.p. 40°. Decomp. on dist. in vacuo. Very sol. ord. org. solvents. Salts decomp. by H₂O.

B, HCl: m.p. 188°.

*B*₂(*COOH*)₂: m.p. 119-20°.

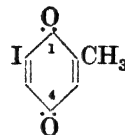
N-Acetyl: 3-iodoacet-*p*-toluidide. Needles from H₂O. M.p. 133°.

N-Benzoyl: needles from EtOH. M.p. 161°.

Elbs, Volk, *J. prakt. Chem.*, 1919, **99**, 270.

Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 445.

6-Iodotoluquinone



C₇H₅O₂I

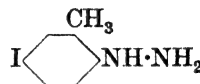
MW, 248

Red needles. M.p. 116-17°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆, CS₂. Sublimes.

4-Oxime: 3-iodo-5-nitroso-*o*-cresol. M.p. 156° decomp.

Kehrmann, *J. prakt. Chem.*, 1888, **37**, 340; 1889, **39**, 398.

4-Iodo-*o*-tolylhydrazine



C₇H₉N₂I

MW, 248

Plates from pet. ether. M.p. 98°.

N-Benzylidene: m.p. 102-3°.

Fichter, *J. prakt. Chem.*, 1906, **74**, 313.

2-Iodotrimethylene Glycol.

See under Glycerol.

Iodotrinitrobenzene.

See Picryl iodide.

α-Iodotriphenylmethane.

See Triphenylmethyl iodide.

3-Iodo-*n*-valeric Acid



C₅H₉O₂I

MW, 228

M.p. 18°. Unstable.

Et ester: C₇H₁₃O₂I. MW, 256. B.p. 102.5°/10.5 mm.

Wohlgemuth, *Compt. rend.*, 1914, **158**, 1577.

4-Iodo-*n*-valeric Acid



C₅H₉O₂I

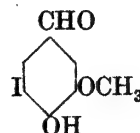
MW, 228

Needles from pet. ether. M.p. 56-7° (54-6°).

Et ester: C₇H₁₃O₂I. MW, 256. B.p. 108-18°/20 mm.

Carter, *J. Am. Chem. Soc.*, 1928, **50**, 1968.

5-Iodovanillin



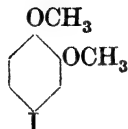
C₈H₇O₃I

MW, 278

M.p. 180°. Spar. sol. EtOH, Et₂O.

Hann, *J. Am. Chem. Soc.*, 1925, **47**, 2000.
See also Bougault, Robin, *Compt. rend.*,
1921, **172**, 452.

4-Iodo-veratrol (4-Iodocatechol dimethyl ether)



C₈H₉O₂I

MW, 264

Needles from MeOH. Aq. M.p. 35°.

Seer, Karl, *Monatsh.*, 1913, **34**, 647.

Tassilly, Leroide, *Compt. rend.*, 1907, **144**,
758.

p-Iodoxyanisole (Isoform)



C₇H₇O₃I

MW, 266

Leaflets from formic or acetic acid. Explodes
above 225°. Sol. hot H₂O. Insol. EtOH, Et₂O.
Antiseptic.

Liebrecht, D.R.P., 161,725, (*Chem. Zentr.*,
1905, **II**, 183.

See also *Chem. Zentr.*, 1904, **II**, 1249.

Iodoxybenzene

C₆H₅·IO₂

C₆H₅O₂I

MW, 236

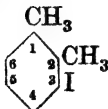
Needles from hot H₂O. Explodes at 236-7°
(227-8°, 211°). Sol. hot H₂O, hot AcOH. Spar.
sol. pet. ether. Insol. EtOH, CHCl₃, C₆H₆,
Me₂CO.

Böeseken, Schneider, *Chem. Abstracts*,
1933, **27**, 1331.

Erlenmeyer, *Helv. Chim. Acta*, 1926, **9**,
819.

Datta, Choudhury, *J. Am. Chem. Soc.*,
1916, **38**, 1085.

3-Iodo-o-xylene



C₈H₉I

MW, 232

B.p. 123°/23 mm., (125-6°/15 mm., 115°/17
mm.). D₂₀ 1.589.

Auwers, *Ann.*, 1919, **419**, 116.

4-Iodo-o-xylene.

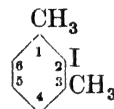
B.p. 225° (228-32° decomp.). Volatile in
steam.

Datta, Chatterjee, *J. Am. Chem. Soc.*,
1917, **39**, 437.

Elbs, Jaroslawzew, *J. prakt. Chem.*, 1913,
88, 93.

Crossley, Hampshire, *J. Chem. Soc.*, 1911,
99, 726.

2-Iodo-m-xylene



C₈H₉I

MW, 232

Oil. B.p. 228-30°. Volatile in steam.

Klages, Liecke, *J. prakt. Chem.*, 1900, **61**,
324.

4-Iodo-m-xylene.

B.p. 232° (220°). D₁₃ 1.6609.

Datta, Chatterjee, *J. Am. Chem. Soc.*,
1917, **39**, 438.

Elbs, Jaroslawzew, *J. prakt. Chem.*, 1913,
88, 93.

5-Iodo-m-xylene.

Oil. B.p. 228°. Volatile in steam.

Klages, Liecke, *J. prakt. Chem.*, 1900,
61, 324.

Iodo-p-xylene



C₈H₉I

MW, 232

B.p. 230°/722 mm. (229°, 217°). D₁₇ 1.5988.

See above references.

6-Iodo-o-3-xyleneol



C₈H₉OI

MW, 248

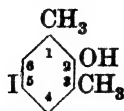
Needles from EtOH. M.p. 84°.

Lockemann, Kunzmann, *Angew. Chem.*,
1933, **46**, 297.

5-Iodo-o-4-xyleneol.

Brown needles. M.p. 71°.

See previous reference.

5-Iodo-*m*-2-xyleneol C_8H_9OI

MW, 248

Brown needles. M.p. 68°.

See previous reference.

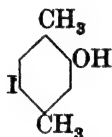
5-Iodo-*m*-4-xyleneol.

Yellow liq. B.p. 108°.

Lockemann, Kunzmann, *Angew. Chem.*, 1933, 46, 298.2-Iodo-*m*-5-xyleneol.

Brown needles. M.p. 74°.

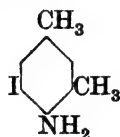
See previous reference.

5-Iodo-*p*-2-xyleneol C_8H_9OI

MW, 248

Needles. M.p. 79°.

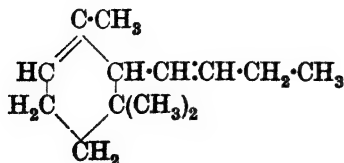
See previous reference.

5-Iodo-*m*-4-xylidine $C_8H_{10}NI$

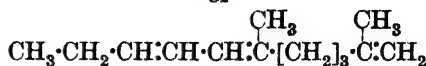
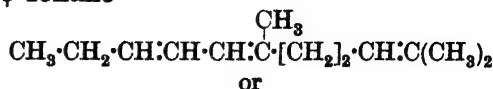
MW, 247

Needles from EtOH. M.p. 65°. Sol. EtOH, Et₂O, ligroin.

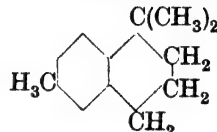
N-Acetyl: m.p. 85°.

Kerschbaum, *Ber.*, 1895, 28, 2799.**Ionane** (1 : 5 : 5-Trimethyl-6- α -butenylcyclohexene) $C_{13}H_{22}$

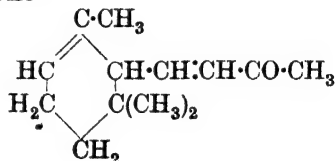
MW, 178

B.p. 220-1°/747 mm. D_4^{20} 0.853. n_D 1.4784.Kizhner, *Chem. Abstracts*, 1912, 6, 735. ψ -Ionane $C_{13}H_{22}$

MW, 178

B.p. 224-5°/751 mm. D_4^{20} 0.8151. n_D 1.4725.Kizhner, *Chem. Abstracts*, 1912, 6, 736.**Ionene** (1 : 1 : 6-Trimethyltetralin, 1 : 1 : 6-trimethyl-1 : 2 : 3 : 4-tetrahydronaphthalene) $C_{13}H_{18}$

MW, 174

Oil. B.p. 112-15°/14 mm., 106-7°/10 mm., 88-91°/4 mm. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. D_4^{25} 0.9320 (0.9299). n_D^{25} 1.52167 (1.52163).Bogert, Davidson, Apfelbaum, *J. Am. Chem. Soc.*, 1934, 56, 959 (*Bibl.*).Tiemann, Krüger, *Ber.*, 1893, 26, 2693. α -Ionone $C_{13}H_{20}O$

MW, 192

Oil. B.p. 146.5-147.5°/28 mm., 136°/17 mm., 134.3°/16 mm., 131.1°/13 mm., 127.6°/12 mm., 123-4°/11 mm. Mod. sol. H₂O. $D_4^{21.2}$ 0.9298. $n_D^{22.3}$ 1.4984 (n_D^{20} 1.5041). Heat of comb. C_p 1837.6 Cal., C_v 1835 Cal.

Oxime: m.p. 89-90°.

Semicarbazone: (i) m.p. 107-8°. (ii) M.p. 137-8°.

Thiosemicarbazone: m.p. 121°.

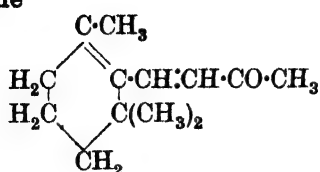
p-Bromophenylhydrazone: m.p. 142-3°.

p-Nitrophenylhydrazone: m.p. 113°.

2 : 4-Dinitrophenylhydrazone: m.p. 125-8°.

Brady, *J. Chem. Soc.*, 1931, 758.Bogert, Fourman, *J. Am. Chem. Soc.*, 1933, 55, 4674.Ito, *Chem. Abstracts*, 1926, 20, 2847.Ballesteros, *Chem. Abstracts*, 1932, 26, 5088.Pummerer, Rebmann, *Ber.*, 1933, 67, 801.Hernandez, Jauma, Verderau, *Chem. Zentr.*, 1928, I, 1954.Tiemann, *Ber.*, 1898, 31, 879, 1736.

β-Ionone



C₁₃H₂₀O

MW, 192

Occurs in essential oil of *Boronia megastigma*, Nees. Oil. B.p. 150–1°/24 mm., 140°/18 mm., 140.4°/16 mm., 134.5–135.5°/14.5 mm., 127–128.5°/10 mm. D₄²⁰ 0.9445. Heat of comb. C_p 1842.1 Cal. n_D 1.521.

Semicarbazone: m.p. 149°.

Thiosemicarbazone: m.p. 158°.

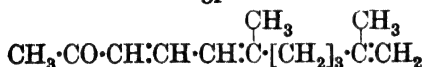
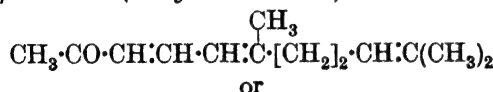
p-Bromophenylhydrazone: m.p. 120°.

p-Nitrophenylhydrazone: m.p. 173°.

Sabetay, *Compt. rend.*, 1929, **189**, 808.

See also last five references above.

ψ-Ionone (Citrylideneacetone)



C₁₃H₂₀O

MW, 192

B.p. 167–8°/23 mm., 143–5°/12 mm. D₄²⁰ 0.8973. n_D²⁰ 1.53116. Heat of comb. C_p 1851 Cal.

Hydrate: m.p. 80°. B.p. 166.8–169.8°/10.5 mm. n_D²¹ 1.50647. Semicarbazone: m.p. 228° decomp.

Semicarbazone: (i) m.p. 142°. (ii) M.p. 116°.

p-Bromophenylhydrazone: m.p. 102–4°.

Hernández, Jaumá, Verderau, *Chem. Zentr.*, 1928, **I**, 1954.

Ito, *Chem. Abstracts*, 1926, **20**, 2847.

Tiemann, *Ber.*, 1898, **31**, 840.

Ipecacuanhic Acid (Ipecacuanhin)

C₁₄H₁₈O₇

MW, 298

Cryst. glucosidal tannin occurring in root of *Psychotria Ipecacuanha*, Stokes. Sol. H₂O, MeOH, EtOH. Insol. Et₂O, CHCl₃. AcOEt, Me₂CO. FeCl₃ → dark green col. Reduces AgNO₃.

Finnemore, Braithwaite, *Chem. Abstracts*, 1912, **6**, 2978.

Huerre, *Chem. Abstracts*, 1920, **14**, 2968.

Ipecacuanhin.

See Ipecacuanhic Acid.

Ipecamine

C₂₅H₃₈O₄N₂

MW, 464 C₁₀H₁₂O₅

M.p. 89–90°. Sol. Et₂O, EtOH, C₆H₆, CHCl₃, Me₂CO. Spar. sol. H₂O, ligroin. [α]_D²² –22.7° in EtOH.

Monobenzoyl deriv.: m.p. 104°.

Hesse, *Ann.*, 1914, **408**, 39.

Ipurolic Acid (2 : 10-Dihydroxymyristic acid)

CH₃·[CH₂]₂·CH(OH)·[CH₂]₇·CH(OH)·CH₂·COOH

C₁₄H₂₈O₄

MW, 260

Occurs in *Ipomœa purpurea*, Roth. M.p. 100–1°.

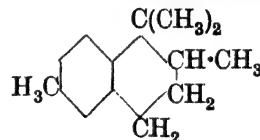
Ag salt: m.p. 160°.

Me ester: C₁₅H₃₀O₄. MW, 274. M.p. 68–9°. [α]_D²⁰ +1.69° in EtOH. Mono-Me ether: C₁₆H₃₂O₄. MW, 288. M.p. 64–5°. Di-phenylurethane: m.p. 96–7°.

Asahina, Nakanishi, *Chem. Abstracts*, 1925, **19**, 3479.

Power, Rogerson, *Chem. Zentr.*, 1908, **II**, 887.

Irene (1 : 1 : 2 : 6-Tetramethyltetralin, 1 : 1 : 2 : 6-tetramethyl-1 : 2 : 3 : 4-tetrahydronaphthalene)



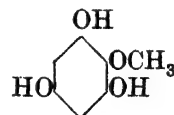
C₁₄H₂₀

MW, 188

B.p. 120–5°/10 mm. n_D²⁰ 1.511.

Bogert, Apfelbaum, *Chem. Zentr.*, 1934, **II**, 2525.

Iretol (1 : 3 : 5-Trihydroxy-2-methoxybenzene, 2 : 4 : 6-trihydroxyanisole)



C₇H₈O₄

MW, 156

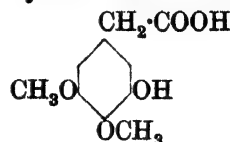
Needles from AcOEt-CHCl₃. M.p. 186°. Sol. H₂O, EtOH, AcOEt. Spar. sol. Et₂O, CHCl₃. Ox. → oxalic acid.

Triacetyl: m.p. 49°. B.p. 230°/25 mm.

Kohner, *Monatsh.*, 1899, **20**, 933.

de Laire, Tiemann, *Ber.*, 1893, **26**, 2015, 2024.

Iridic Acid (3-Hydroxy-4 : 5-dimethoxyphenyl-acetic acid, homogallic acid 3 : 4-dimethyl ether)



MW, 212

Prisms from hot C_6H_6 . M.p. 118° . Sol. H_2O , EtOH, Et_2O , $CHCl_3$, Me_2CO , hot C_6H_6 . Insol. ligroin. Heat \rightarrow iridol.

Me ester: $C_{11}H_{14}O_5$. MW, 226. Oil. B.p. above 360° .

Amide: $C_{10}H_{13}O_4N$. MW, 211. Needles from H_2O . M.p. 113° . Sol. EtOH, Me_2CO . Spar. sol. C_6H_6 , Et_2O .

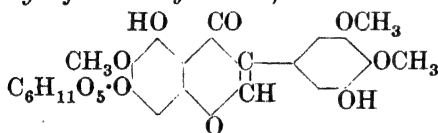
Acetyl: m.p. 125° .

Benzoyl: m.p. 131° .

Me ether: 3:4:5-trimethoxyphenylacetic acid. $C_{11}H_{14}O_5$. MW, 226. Plates. M.p. 120° . de Laire, Tiemann, *Ber.*, 1893, 26, 2016.

Baker, Robinson, *J. Chem. Soc.*, 1929, 160.

Iridin (5:7:5'-Trihydroxy-6:3':4'-trimethoxyisoflavone-7-glucoside)



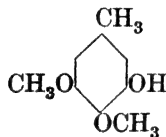
$C_{24}H_{26}O_{13}$

MW, 522

Glucoside occurring in rhizome of *Iris florentina* (Orris root). Needles from MeOH.Aq. M.p. 208° . Sol. Me_2CO , hot EtOH. Spar. sol. H_2O . Insol. Et_2O , C_6H_6 , $CHCl_3$, AcOEt. Hyd. \rightarrow irigenin + glucose. $FeCl_3 \rightarrow$ reddish-violet col.

Baker, *J. Chem. Soc.*, 1928, 1022 (*Bibl.*).

Iridol (3-Hydroxy-4:5-dimethoxytoluene, 5-methylpyrogallol 1:2-dimethyl ether)



$C_9H_{12}O_3$

MW, 168

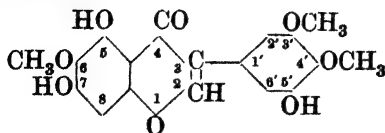
M.p. 57° . B.p. 239° . Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$, AcOEt. Insol. H_2O .

Benzoyl: m.p. 68° .

Me ether: 3:4:5-trimethoxytoluene. $C_{10}H_{14}O_3$. MW, 182. Oil. B.p. $236-7^\circ$.

de Laire, Tiemann, *Ber.*, 1893, 26, 2018.

Irigenin (5:7:5'-Trihydroxy-6:3':4'-trimethoxyisoflavone, irigenol 6:3':4'-trimethyl ether)



$C_{18}H_{16}O_8$

MW, 360

Pale yellow needles or plates from hot EtOH.Aq. M.p. 185° (186°). Sol. AcOEt, hot EtOH, hot C_6H_6 , hot $CHCl_3$. Spar. sol. H_2O . Insol. Et_2O , ligroin. $FeCl_3 \rightarrow$ reddish-violet col. Hyd. $\rightarrow H\cdot COOH +$ iridic acid + iretol.

5:5'-Di-Me ether: 7-hydroxy-5:6:3':4':5-pentamethoxyisoflavone. $C_{20}H_{20}O_8$. MW, 388. M.p. 218° .

7:5'-Di-Me ether: 5-hydroxy-6:7:3':4':5'-pentamethoxyisoflavone. M.p. $166-7^\circ$. Acetyl deriv.: m.p. 191° .

Tri-Me ether: 5:6:7:3':4':5'-hexamethoxyisoflavone. $C_{21}H_{22}O_8$. MW, 402. M.p. 163° .

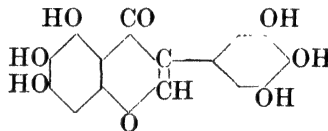
7:5'-Diacetyl: m.p. 169° .

5:7:5'-Triacetyl: m.p. $127-8^\circ$.

7:3'-Dibenzoyl: m.p. $155-60^\circ$.

Baker, *J. Chem. Soc.*, 1928, 1022 (*Bibl.*).

Irigenol (5:6:7:3':4':5'-Hexahydroxyisoflavone)



$C_{15}H_{10}O_8$

MW, 318

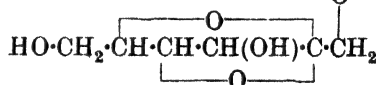
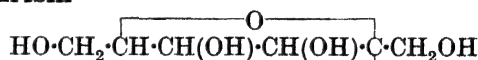
Pale yellow needles + $1H_2O$ from AcOH.Aq. M.p. 331° decomp. Sol. Me_2CO . Spar. sol. H_2O , EtOH, AcOH, C_6H_6 , AcOEt. $FeCl_3 \rightarrow$ olive-green col.

Hexa-acetyl: m.p. $237-8^\circ$.

Me ethers: see Irigenin.

Baker, *J. Chem. Soc.*, 1928, 1025.

Irisin



Unit of structure

$(C_6H_{10}O_5)_n$

MW, $(162)_n$

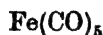
Polysaccharide from *Iris pseudoacorus*, Linn. Powder. M.p. 210° . $[\alpha]_D^{20} - 53.3^\circ$ in H_2O . Hyd. \rightarrow fructose. Reduces Fehling's.

Me ether: m.p. $188-90^\circ$. $[\alpha]_D^{20} - 63.2^\circ$ in $CHCl_3$.

Triacetyl deriv.: m.p. 217° . $[\alpha]_D^{20} - 23.1^\circ$ in AcOH.

Colin, Augem, *Bull. soc. chim. biol.*, 1928, 10, 489.

Schlubach, Knoop, Liu, *Ann.*, 1933, 504, 34.

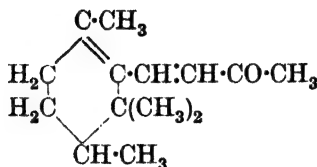
Iron carbonyl (*Iron pentacarbonyl*) $\text{C}_5\text{H}_5\text{Fe}$

MW, 196

Pale yellow viscous liq. F.p. -19.5° to -20° . B.p. $102.8^\circ/749$ mm. Decomp. at $180^\circ \rightarrow \text{Fe} + \text{CO}$. D_{18}^{18} 1.4664.

Mond, Langer, *J. Chem. Soc.*, 1891, 59, 1090.

I.G., D.R.P., 485,886, (*Chem. Abstracts*, 1930, 24, 1187).

Iron $\text{C}_{14}\text{H}_{22}\text{O}$

MW, 206

Occurs in essential oil of *Iris florentina*. B.p. $144^\circ/16$ mm., $93.5^\circ/0.1$ mm. D_4^{18} 0.939. n_D^{18} 1.502. $[\alpha]_D + 47^\circ$.

Semicarbazone: m.p. $190-5^\circ$.

Thiosemicarbazone: m.p. $110-12^\circ$.

Phenylsemicarbazone: m.p. $178-9^\circ$.

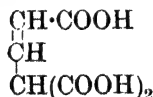
p-Bromophenylhydrazone: m.p. $163-9^\circ$ (175° apid heat.).

Ruzicka, Seidel, Schinz, *Helv. Chim. Acta*, 1933, 16, 1143.

Iron pentacarbonyl.

See Iron carbonyl.

Isaconitic Acid (*Isoaconitic acid propylens-1 : 3 : 3 -tricarboxylic acid*)

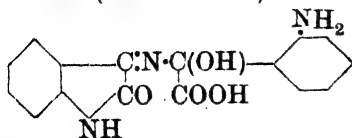
 $\text{C}_6\text{H}_6\text{O}_6$

MW, 174

Tri-Et ester: $\text{C}_{12}\text{H}_{18}\text{O}_6$. MW, 258. Oil. B.p. 248° , $178-80^\circ/20$ mm., $176-8^\circ/17$ mm. Sol. EtOH, Et₂O. D_{18}^{18} 1.0505.

Guthzeit, Laska, *J. prakt. Chem.*, 1898, 58, 404.

Guthzeit, Eyssen, *J. prakt. Chem.*, 1909, 80, 41.

Isamic Acid (*Imasatic acid*) $\text{C}_{16}\text{H}_{13}\text{O}_4\text{N}_3$

MW, 311

Dict. of Org. Comp.—II.

Red prisms from EtOH. M.p. $164-5^\circ$ decomp. Sol. EtOH, Py. Spar. sol. Et₂O. Insol. C₆H₆, ligroin. Min. acids \rightarrow violet col.

Aniline salt: m.p. 198° .

Anilide: m.p. 168° .

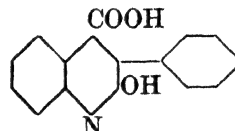
Monobenzoyl deriv.: m.p. 188° .

Amide: amasatin. $\text{C}_{16}\text{H}_{14}\text{O}_3\text{N}_4$. MW, 310. Yellow cryst. from EtOH. M.p. 193° .

Lactam: see Imasatin.

Reissert, Hoppmann, *Ber.*, 1924, 57, 977.

Isaphenic Acid (*2-Hydroxy-3-phenylquinoline-4-carboxylic acid, 2-hydroxy-3-phenylcinchoninic acid*)

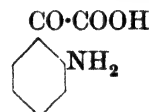
 $\text{C}_{16}\text{H}_{11}\text{O}_3\text{N}$

MW, 265

Leaflets from AcOH. M.p. $294-6^\circ$. Insol. C₆H₆, CHCl₃.

Borsche, Jacobs, *Ber.*, 1914, 47, 357.

Isatic Acid (*o-Aminobenzoylformic acid, o-aminophenylglyoxylic acid, isatinic acid*)

 $\text{C}_8\text{H}_7\text{O}_3\text{N}$

MW, 165

Powder. Unstable. Sol. H₂O. Hot H₂O \rightarrow isatin.

N-Formyl: m.p. 144° . Et ester: m.p. 67° .

N-Acetyl: m.p. 160° .

N-Benzoyl: m.p. 188° decomp. Et ester: m.p. $80-1^\circ$. Amide: m.p. $215-16^\circ$.

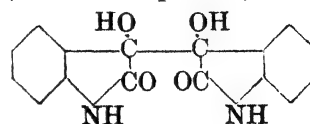
Schotten, *Ber.*, 1891, 24, 773.

Erdmann, *J. prakt. Chem.*, 1841, 24, 13.

Hantzsch, *Ber.*, 1924, 57, 196.

Suida, *Ber.*, 1878, 11, 586.

Heller, Lauth, *J. prakt. Chem.*, 1926, 113, 231.

Isatide (*Isatin-3 : 3'-pinacol*) $\text{C}_{16}\text{H}_{12}\text{O}_4\text{N}_2$

MW, 296

Greyish cryst. M.p. 245° (217° decomp.) Spar. sol. Et₂O, hot EtOH. Insol. H₂O. Heat of comb. C₂ 1777.5 Cal.

N : N'-Di-Me: $\text{C}_{18}\text{H}_{16}\text{O}_4\text{N}_2$. MW, 324. M.p. 176° .

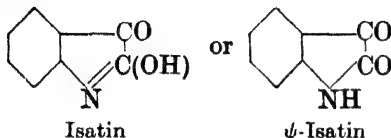
N : N'-Diphenyl : $C_{28}H_{20}O_4N_2$. MW, 448.
M.p. 195°. Diacetyl deriv. : m.p. 221°. Di-
benzoyl deriv. : m.p. 254°.

Tetra-acetyl deriv. : m.p. 223°.

Hansen, *Ann. chim.*, 1924, 1, 120.

Stollé, Merkle, *J. prakt. Chem.*, 1933, 139,
329.

Isatin



$C_8H_5O_2N$ MW, 147
Yellowish-red prisms. M.p. 203.5°. Sol. cold
dil. alkalis but hyd. on heating. Sol. MeOH,
EtOH, Me_2CO , C_6H_6 . Spar. sol. cold H_2O ,
 Et_2O . Heat of comb. C_p 867.4 Cal. Sublimes.
Intermediate for indigoid vat dyestuffs.

Oxime : m.p. 201-2°.

ω-Phenylcarbohydrazide : m.p. 281°.

ω-o-Tolylcarbohydrazide : m.p. 251-2°.

N-Acetyl : m.p. 141°.

N-Me : see N-Methyl-ψ-isatin.

2-Me ether : $C_9H_7O_2N$. MW, 161. Red
prisms. M.p. 102-3°. Sol. MeOH, EtOH,
 C_6H_6 , Me_2CO . Mod. sol. Et_2O , hot H_2O . Un-
stable in air and in sols. in H_2O and EtOH.

Wibaut, Geerling, *Rec. trav. chim.*, 1931,
50, 41.

General Aniline Works, U.S.P., 1,792,170,
(*Chem. Abstracts*, 1931, 25, 1845).

Marvel, *Organic Syntheses*, 1925, V, 71.

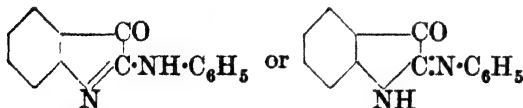
Hartley, Dobbie, *J. Chem. Soc.*, 1899, 75,
644.

Hantzsch, *Ber.*, 1921, 54, 1242.

ψ-Isatin.

See Isatin.

Isatin α-anilide (Isatin-2-anil)



$C_{14}H_{10}ON_2$ MW, 222

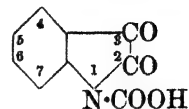
Dark brownish-violet needles from C_6H_6 .
Orange-red leaflets from EtOH. M.p. 126°. Sol. Et_2O , C_6H_6 , CS_2 , hot EtOH. Sol. aq. min.
and org. acids. $H_2S \rightarrow$ indigo. Intermediate
for certain indigoid vat dyestuffs.

Geigy, D.R.Ps., 113,980, 113,981, (*Chem.*
Zentr., 1900, II, 929).

Stephan, U.S.P., 1,427,863, (*Chem. Ab-*
stracts, 1922, 16, 3762).

See also Pummerer, Göttler, *Ber.*, 1910, 43,
1376, and Sandmeyer, *Zeitschrift für*
Farben-und Textil-Chemie, 1903, 2, 129.

Isatin-N-carboxylic Acid



$C_9H_5O_4N$ MW, 191

Me ester : $C_{10}H_7O_4N$. MW, 205. M.p. 170°
decomp.

Et ester : $C_{11}H_9O_4N$. MW, 219. Yellow
prisms from pet. ether. M.p. 115° (117°). Di-
oxime : m.p. 145° decomp.

Heller, *Ber.*, 1918, 51, 431.

Putochin, *Ber.*, 1927, 60, 1638.

Isatin-4-carboxylic Acid.

Decomp. about 200°.

Et ester : $C_{11}H_9O_4N$. MW, 219. M.p. 140°.

3-Phenylhydrazide : decomp. about 200°.

Braun, Hahn, *Ber.*, 1923, 56, 2343.

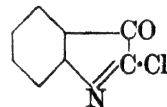
Isatin-7-carboxylic Acid.

Brownish-yellow cryst. M.p. 235°.

Sandmeyer, *Helv. Chim. Acta*, 1919, 2,
241.

Geigy, D.R.P., 320,647, (*Chem. Zentr.*,
1920, IV, 223).

Isatin α-chloride



C_8H_4ONCl MW, 165.5

Brown needles. M.p. 180° decomp. Sol.
EtOH, AcOH, hot C_6H_6 , Et_2O . Et_2O sol. blue.
Decomp. in moist air. $KOH \rightarrow$ isatin. Inter-
mediate for indigoid vat dyestuffs.

Baeyer, *Ber.*, 1879, 12, 456.

Isatinic Acid.

See Isatic Acid.

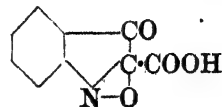
Isatinimide.

See Imesatin.

Isatin pinacol.

See Isatide.

Isatogenic Acid (Isatogen-2-carboxylic acid)



$C_9H_5O_4N$

MW, 191

Isidic Acid.

See Physodylic Acid.

Isoacetonitrile.

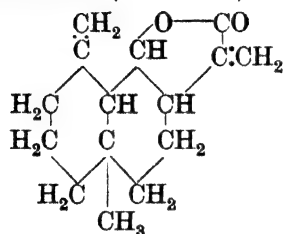
See Methyl isocyanide.

Isoacetophorone.

See Isophorone.

Isoaconitic Acid.

See Isaconitic Acid.

Isoalantolactone (Isohelenin) $C_{15}H_{20}O_2$

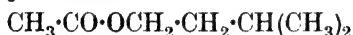
MW, 232

Occurs in essential oil of *Inula Helenium*. Prisms from EtOH.Aq. M.p. 112° (115°). Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Spar. sol. ligroin. Insol. H₂O.

Hansen, *J. prakt. Chem.*, 1933, **136**, 185 (Bibl.).

Isoallylene.

See Allene.

Isoamylacetamide.See under 4-Amino-2-methyl-*n*-butane.**Isoamyl acetate** $C_7H_{14}O_2$

MW, 130

B.p. 142°, 138°/744 mm. D_4^{15} 0.8762. n_D^{25} 1.3999. Sol. to 0.25% in H₂O at 15°. 6 Mols. + 1 mol. MgI₂ in Et₂C → mol. comp., cryst., m.p. 60°.

Kakutani, Ishii, *Chem. Abstracts*, 1927, **21**, 2119.

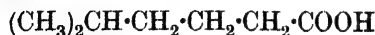
Gay, Mion, Aumeras, *Bull. soc. chim.*, 1927, **41**, 1027.

Aschan, *Chem. Zentr.*, 1918, II, 939.

Höchst, D.R.P., 282,266, (*Chem. Zentr.*, 1915, I, 516).

Buchseiler, D.R.P., 232,818, (*Chem. Zentr.*, 1911, I, 1090).

Isoamylacetic Acid (*Isoheptoic acid*, *isoheptylic acid*, *4-methyl-*n*-caproic acid*, *5-methyl-hexzoic acid*)

 $C_7H_{14}O_2$

MW, 130

B.p. 216°, 205–7°/683 mm. D^{19} 0.9155. n_D^{19} 1.4209. O₃ in CHCl₃ → succinic acid. H₂O₂ in weak acid sol. → acetone.

Et ester : C₉H₁₈O₂. MW, 158. B.p. 183°/750 mm.

Amide : C₇H₁₅ON. MW, 129. M.p. 104°.

Nitrile : C₇H₁₃N. MW, 111. B.p. 178–80°.

Anilide : m.p. 75°.

Bhide, Sudborough, *J. Indian Inst. Sci.*, 1925, **8A**, 97.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 442.

Wallach, *Ann.*, 1915, **408**, 190.

Isoamylacetone (*Acetylisoamylmethane*, *methyl isohexyl ketone*, *2-methylheptanone-6*)

 $C_8H_{16}O$

MW, 128

B.p. 170–1° (165°). D^{20} 0.8151. n_D^{19} 1.4144. Misc. with most org. solvents. Forms bisulphite comp. NaOBr → isoamylacetic acid + bromoform.

Semicarbazone : m.p. 155°.

Wallach, *Ann.*, 1915, **408**, 185.

Buelens, *Chem. Zentr.*, 1909, I, 832.

Isoamyl acetonyl Ether.

See under Hydroxyacetone.

Isoamylacetylene (*5-Methyl-1-hexine*) C_7H_{12}

MW, 96

B.p. 92–3°. D^{17} 0.7365. n_D^{17} 1.4075.

Picon, *Compt. rend.*, 1919, **168**, 894.

André, *Ann. chim.*, 1913, **29**, 554.

2-Isoamylacrylic Acid.

See 5-Methyl-1-heptenic Acid.

Isoamyl Alcohol (*Isobutylcarbinol*, *3-methyl-butanol-1*)

 $C_5H_{12}O$

MW, 88

B.p. 132°, 128.5°/750 mm. D_4^{15} 0.8129. n_D^{20} 1.4075, n_D^{15} 1.4085. Sol. to 2.6% in H₂O at 20°.

Phenylurethane : m.p. 57° (82.5°).

1-Naphthylurethane : m.p. 76° (67–8°).

p-Nitrophenylurethane : m.p. 97.5°.

Acid nitrophthalate : m.p. 165–6°.

Timmermans, Hennaut-Roland, *Chem. Abstracts*, 1930, **24**, 54.

Kirkpatrick, *Chem. Met. Eng.*, 1927, **34**, 276.

Martin, *Chem. Abstracts*, 1920, **14**, 3642.

Aschan, *Chem. Zentr.*, 1918, II, 939.

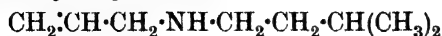
Michael, Zeidler, *Ann.*, 1911, **385**, 278.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 443.

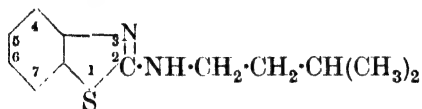
Braun, Manz, *Ber.*, 1934, **67**, 1710.

sec.-Isoamyl Alcohol.

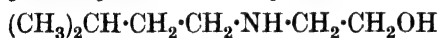
See Methylisopropylcarbinol.

Isoamylallylamine $\text{C}_8\text{H}_{17}\text{N}$ MW, 127B.p. 148–53°. D_4^{20} 0.7777. Insol. H_2O .Liebermann, Paal, *Ber.*, 1883, **16**, 525, 531.**Isoamyl allyl Ether** $\text{C}_8\text{H}_{16}\text{O}$ MW, 128

B.p. 120°.

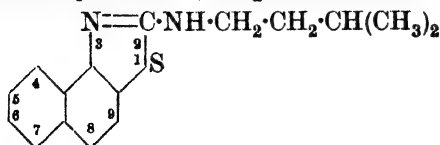
Berthelot, Luca, *Ann. chim.*, 1856, **48**, 292.**Isoamylamine.**See 4-Amino-2-methyl-*n*-butane.**2-Isoamylaminobenzthiazole** (1-Isoamylaminobenzthiazole. See Note under 2-Aminobenzthiazole) $\text{C}_{12}\text{H}_{16}\text{N}_2\text{S}$ MW, 220

Needles from EtOH. M.p. 69–71°.

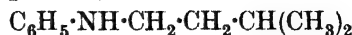
Hunter, *J. Chem. Soc.*, 1926, 2957.**2-Isoamylaminoethyl Alcohol** (N-2-Hydroxyethylisoamylamine, isoamylethanolamine) $\text{C}_7\text{H}_{17}\text{ON}$ MW, 131Oil. B.p. 209–10°/751 mm. D_4^{20} 0.8822. n_D^{20} 1.4447. Sol. H_2O , EtOH, Et_2O .

Picrate: yellow prisms from EtOH.Aq. M.p. 94–5°.

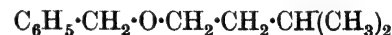
Picrolonate: yellowish-brown prisms from EtOH.Aq. M.p. 220° decomp.

Matthes, *Ann.*, 1901, **315**, 120.**2-Isoamylamino-β-naphthathiazole** $\text{C}_{16}\text{H}_{18}\text{N}_2\text{S}$ MW, 270

Cryst. from MeOH. M.p. 90°.

Dyson, Hunter, Morris, *J. Chem. Soc.*, 1932, 2283.**Isoamylaniline** (N-Phenylisoamylamine, 4-anilinoisopentane) $\text{C}_{11}\text{H}_{17}\text{N}$ MW, 163B.p. 254.5° (242–4°), 126–7°/14 mm. D_4^{25} 0.928. $B\cdot\text{HCl}$: m.p. 151°. $B\cdot\text{HBr}$: m.p. 148–51°.*m*-Nitrobenzenesulphonyl deriv.: m.p. 104–5°.*p*-Toluenesulphonyl deriv.: m.p. 81°.Hickinbottom, *J. Chem. Soc.*, 1932, 2398.Voss, Blanke, *Ann.*, 1931, **485**, 280.Mailhe, *Bull. soc. chim.*, 1919, **25**, 324.Nef, *Ann.*, 1901, **318**, 141.**Isoamylanisole.**See under *p*-Isoamylphenol.**Isoamylbenzene** (4-Phenylisopentane, 2-methyl-4-phenylbutane) $\text{C}_{11}\text{H}_{16}$ MW, 148Liq. with odour of oranges. B.p. 193° (189–91°). D_4^{20} 0.856. n_D^{18} 1.4867.Gilman, Beaber, *J. Am. Chem. Soc.*, 1925, **47**, 523.Gleditsch, *Bull. soc. chim.*, 1906, **35**, 1095.Schramm, *Ann.*, 1883, **218**, 390.**Isoamylbenzylamine** $\text{C}_{12}\text{H}_{19}\text{N}$ MW, 177

B.p. 240°.

 $B\cdot\text{HCl}$: needles. M.p. 253°. Spar. sol. H_2O . $B\cdot\text{HAuCl}_3$: leaflets from H_2O . M.p. 190°. $B_2\cdot\text{H}_2\text{PtCl}_6$: m.p. 203°.Ishizaka, *Ber.*, 1914, **47**, 2456.Einhorn, Pfeiffer, *Ann.*, 1900, **310**, 221.**Isoamyl benzyl Ether** $\text{C}_{12}\text{H}_{18}\text{O}$ MW, 178B.p. 235°/744 mm. D_4^{20} 0.920.Senderens, *Compt. rend.*, 1924, **178**, 1412.**Isoamyl benzyl Ketone** $\text{C}_{13}\text{H}_{18}\text{O}$ MW, 190

B.p. 267°.

Semicarbazone: m.p. 133°.

Blaise, *Compt. rend.*, 1901, **133**, 1218.Mailhe, *Compt. rend.*, 1913, **157**, 221.

Isoamyl bromide (1-Bromo-3-methylbutane, 4-bromoisopentane)

$(\text{CH}_3)_2\text{CH}\cdot\text{CH}_2\cdot\text{CH}_2\text{Br}$
 $\text{C}_5\text{H}_{11}\text{Br}$ MW, 151

F.p. — 112°. B.p. 121.5° (120.6°), 119.2°/737 mm. D_4^{15} 1.2095. n_D^{15} 1.4433.

Timmermans, Hennaut-Roland, *Chem. Abstracts*, 1930, **24**, 54.

Kamm, Marvel, *Organic Syntheses*, 1921, **I**, 4.

Michael, Zeidler, *Ann.*, 1911, **385**, 277.

Isoamyl butyrate

$\text{CH}_3\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CO}\cdot\text{OCH}_2\cdot\text{CH}_2\cdot\text{CH}(\text{CH}_3)_2$
 $\text{C}_9\text{H}_{18}\text{O}_2$ MW, 158

Liq. with odour of pears. B.p. 179°. D_4^{19} 0.8657.

Dietz, *Z. physiol. Chem.*, 1907, **52**, 279.

Szameitat, *Ullmann's Enzyklopädie der technischen Chemie*, 1916, **III**, 150.

Isoamylcarbinol.

See Isohexyl Alcohol.

Isoamyl chloride (1-Chloro-3-methylbutane, 4-chloroisopentane)

$(\text{CH}_3)_2\text{CH}\cdot\text{CH}_2\cdot\text{CH}_2\text{Cl}$
 $\text{C}_5\text{H}_{11}\text{Cl}$ MW, 106.5

B.p. 99°/734 mm. D_0 0.8928.

Underwood, Gale, *J. Am. Chem. Soc.*, 1934, **56**, 2117.

Aschan, *Chem. Zentr.*, 1918, **II**, 939.

Darzens, *Compt. rend.*, 1911, **152**, 1316.

Ssolonina, *Chem. Zentr.*, 1898, **II**, 888.

Isoamyl cyanide.

See under Isocaproic Acid.

Isoamyl 2 : 4-dihydroxyphenyl Ketone.

See 4-Isocaproylresorcinol.

α -Isoamylene.

See 3-Methylbutylene-1.

β -Isoamylene.

See 2-Methylbutylene-2.

Isoamylethylene.

See 5-Methyl-1-hexene.

Isoamyl fluoride (1-Fluoro-3-methylbutane, 4-fluoroisopentane)

$(\text{CH}_3)_2\text{CH}\cdot\text{CH}_2\cdot\text{CH}_2\text{F}$
 $\text{C}_5\text{H}_{11}\text{F}$ MW, 90

B.p. 53.5°. D_4^{20} 0.6945.

Tronov, Krüger, *Chem. Abstracts*, 1927, **12**, 3887.

Swarts, *Bull. soc. chim. Belg.*, 1921, **30**, 302.

Isoamyl formate

$\text{H}\cdot\text{CO}\cdot\text{OCH}_2\cdot\text{CH}_2\cdot\text{CH}(\text{CH}_3)_2$
 $\text{C}_6\text{H}_{12}\text{O}_2$ MW, 116

B.p. 124.2° (123.5°). D_4^{20} 0.8773. Sol. 325 parts H_2O at 22°.

Sucharda, Mazonski, *Chem. Abstracts*, 1933, **27**, 5954.

Mathews, Faville, *J. Phys. Chem.*, 1918, **22**, 1.

Stähler, *Ber.*, 1914, **47**, 590.

Sabatier, Mailhe, *Compt. rend.*, 1911, **152**, 1045.

Engelskirchen, D.R.P., 255,441, (*Chem. Zentr.*, 1913, **I**, 349).

Isoamylfumaric Acid (Isobutylmesaconic acid, 5-methyl-1-hexene-1 : 2-dicarboxylic acid)

$(\text{CH}_3)_2\text{CH}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{C}\cdot\text{COOH}$
 $\text{HOOC}\cdot\text{CH}$

$\text{C}_9\text{H}_{14}\text{O}_4$ MW, 186

Leaflets from H_2O . M.p. 205–6°. Very sol. boiling H_2O . Sol. EtOH , Et_2O . Insol. CHCl_3 , C_6H_6 . $\text{KMnO}_4 \rightarrow$ isobutylpyruvic acid.

Fittig, *Ann.*, 1899, **304**, 302; **305**, 58.

Isoamylhexylcarbinol (2-Methylundecanol-5)

$\text{CH}_3\cdot[\text{CH}_2]_5\cdot\text{CH}(\text{OH})\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}(\text{CH}_3)_2$
 $\text{C}_{12}\text{H}_{26}\text{O}$ MW, 186

Thick liq. B.p. 130–3°/20 mm. Sol. EtOH , Et_2O . Insol. H_2O . D_4^{20} 0.8392, D_4^{20} 0.8235.

Wanin, *J. Russ. Phys.-Chem. Soc.*, 1915, **47**, 1094.

Isoamyl iodide (1-Iodo-3-methylbutane, 4-iodoisopentane)

$(\text{CH}_3)_2\text{CH}\cdot\text{CH}_2\cdot\text{CH}_2\text{I}$
 $\text{C}_5\text{H}_{11}\text{I}$ MW, 198

B.p. 147°. D_4^{18} 1.515. Heat + PbO at 240° \rightarrow trimethylethylene. With 1 mol. quinoline + HgI_2 in hot $\text{Me}_2\text{CO} \rightarrow$ comp., m.p. 160°.

Adams, Voorhees, *J. Am. Chem. Soc.*, 1919, **41**, 798.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 441.

Michael, Zeidler, *Ann.*, 1911, **385**, 275.

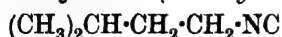
Isoamyl isobutyrate

$(\text{CH}_3)_2\text{CH}\cdot\text{CO}\cdot\text{OCH}_2\cdot\text{CH}_2\cdot\text{CH}(\text{CH}_3)_2$
 $\text{C}_9\text{H}_{18}\text{O}_2$ MW, 158

B.p. 169°. D_4^{20} 0.876.

Sabatier, Mailhe, *Compt. rend.*, 1912, **154**, 176.

Mailhe, *Chem. Abstracts*, 1924, **18**, 1419.

Isoamyl isocyanide (*Isoamyl carbylamine*)

$\text{C}_6\text{H}_{11}\text{N}$ MW, 97

B.p. 139–40° (137°). Heat of comb. C_p 948.2 Cal.

Guillemand, *Ann. chim.*, 1908, **14**, 415.

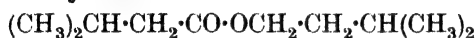
Isoamyl isothiocyanate (*Isoamyl mustard oil, isoamyl thiocarbimide*)

$\text{C}_6\text{H}_{11}\text{NS}$ MW, 129

Pungent liq. with floral odour. B.p. 183°. D_4^{17} 0.9419.

Dyson, Hunter, *Rec. trav. chim.*, 1926, **45**, 423.

Stieger, *Monatsh.*, 1916, **37**, 640.

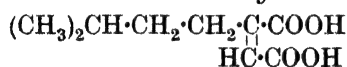
Isoamyl isovalerate

$\text{C}_{10}\text{H}_{20}\text{O}_2$ MW, 172

Occurs in banana fruit. B.p. 190.5° (194°), 112°/80 mm., 100.7°/40 mm., 72.8°/11 mm. D_4^{19} 0.8583. n_D^{19} 1.4130.

Kodama, *J. Biochem. Japan*, 1922, **1**, 213.
Tischtschenko, *Chem. Zentr.*, 1906, **II**, 1552.

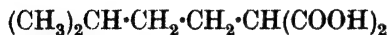
Balbiano, *Gazz. chim. ital.*, 1876, **6**, 238.

Isoamylmaleic Acid (*Isobutylcitraconic acid, 5-methyl-1-hexene-1 : 2-dicarboxylic acid*)

$\text{C}_9\text{H}_{14}\text{O}_4$ MW, 186

Leaflets from CHCl_3 -ligroin. M.p. 76–80° → anhydride (yellow oil). Very sol. H_2O , EtOH , Et_2O , CHCl_3 .

Fittig, *Ann.*, 1899, **304**, 299; **305**, 56.

Isoamylmalonic Acid (*Isohexane-5 : 5-dicarboxylic acid, 2-methylpentane-5 : 5-dicarboxylic acid*)

$\text{C}_8\text{H}_{14}\text{O}_4$ MW, 174

Needles from C_6H_6 -ligroin. M.p. 93°. Sol. H_2O , EtOH , Et_2O , AcOEt , hot C_6H_6 . Very spar. sol. ligroin, pet. ether.

Di-Et ester: $\text{C}_{12}\text{H}_{22}\text{O}_4$. MW, 230. B.p. 240–2° (245–50°/747 mm.), 150–2°/45 mm., 130–2°/15 mm., 102°/3 mm. n_D^{20} 1.4255.

Et ester-nitrile: $\text{C}_{10}\text{H}_{17}\text{O}_2\text{N}$. MW, 183. B.p. 241°/749 mm., 125°/12 mm. D_4^{21} 0.939.

Monoamide: $\text{C}_8\text{H}_{15}\text{O}_3\text{N}$. MW, 173. M.p. 136° decomp. *Et ester*: m.p. 97°.

Mononitrile: 1-cyanoisoamylacetic acid. $\text{C}_8\text{H}_{13}\text{O}_2\text{N}$. MW, 155. M.p. 47–8°. B.p. 175–80°/16 mm.

Amide-nitrile: 1-cyanoisoamylacetamide. $\text{C}_8\text{H}_{14}\text{ON}_2$. MW, 154. Cryst. from EtOH . Aq. M.p. 142°.

Diamide: $\text{C}_8\text{H}_{16}\text{O}_2\text{N}_2$. MW, 172. Needles from EtOH . M.p. 210°.

Di-nitrile: 1-cyanoisoamylacetoneitrile. $\text{C}_8\text{H}_{12}\text{N}_2$. MW, 136. B.p. 121–2°/18 mm. D_4^{25} 0.899.

Dianilide: needles. M.p. 185°.

Dihydrazide: needles. M.p. 149° decomp.

Shonle, Keltch, Swanson, *J. Am. Chem. Soc.*, 1930, **52**, 2440.

Curtius, Wirbatz, *J. prakt. Chem.*, 1930, **125**, 267.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 441.

Hessler, *J. Am. Chem. Soc.*, 1913, **35**, 992.

Paal, Hofmann, *Ber.*, 1890, **23**, 1496.

Isoamyl Mercaptan (*4-Mercaptoisopentane, isoamyl thioalcohol, thioisoamyl alcohol*)

$\text{C}_5\text{H}_{12}\text{S}$ MW, 104

B.p. 116° (120–2°). D_4^{20} 0.83475. n_D^{20} 1.44118. Heat of comb. C_p 992 Cal.

Sabatier, Mailhe, *Compt. rend.*, 1910, **150**, 1219, 1569.

Nord, *Ber.*, 1919, **52**, 1207.

Isoamyl nitrate

$\text{C}_5\text{H}_{11}\text{O}_3\text{N}$ MW, 133

B.p. 147–8°. D_4^{22} 0.9961. n_D^{22} 1.4122.

Bouveault, Wahl, *Bull. soc. chim.*, 1903, **29**, 957.

Isoamyl nitrite (*Ordinary amyl nitrite*)

$\text{C}_5\text{H}_{11}\text{O}_2\text{N}$ MW, 117

B.p. 99°. D_4^{19} 0.880. n_D^{21} 1.38708. Misc. with EtOH , Et_2O . Spar. sol. H_2O . Heat of comb. C_p 812.6 Cal.

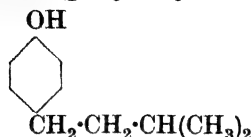
Wilson, Yang, *Chem. Abstracts*, 1931, **25**, 4846.

Sugden, Reed, Wilkins, *J. Chem. Soc.*, 1925, 1537.

Neogi, *J. Chem. Soc.*, 1914, **105**, 2371.

Witt, *Ber.*, 1886, **19**, 915 (*Footnote*).

p-Isoamylphenol (*p-Hydroxyisoamylbenzene*)



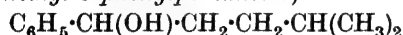
$C_{11}H_{15}O$ MW, 163

B.p. 126°/14 mm.

Me ether: *p*-isoamylanisole. $C_{12}H_{17}O$. MW, 177. B.p. 121°/14 mm.

Baranger, *Bull. soc. chim.*, 1931, **49**, 1214, 1217.

Isoamylphenylcarbinol (*5-Hydroxy-2-methyl-5-phenylpentane, α-hydroxyisoheptylbenzene, 2-methyl-5-phenylpentanol-5*)



$C_{12}H_{18}O$ MW, 178

B.p. 132°/8 mm. D_4^{19} 0.9536. n_D^{20} 1.5071.

Acetyl: b.p. 137-9°/9 mm.

Grignard, *Ann. chim.*, 1901, **24**, 468.

Isoamyl phenyl Ether



$C_{11}H_{16}O$ MW, 164

B.p. 215° (225°). D_4^{25} 0.9198.

Voss, Blanke, *Ann.*, 1931, **485**, 279.

Sabatier, Mailhe, *Compt. rend.*, 1910, **151**, 362.

Hantzsch, Vock, *Ber.*, 1903, **36**, 2062.

Isoamyl phenyl Ketone.

See Isocaprophenone.

Isoamylpropenylcarbinol.

See 7-Methyl-2-octenol-4.

Isoamyl propionate



$C_8H_{16}O_2$ MW, 144

B.p. 160-1°. D_{15}^{20} 0.8580. Vapour + NH_3 passed over heated thoria \rightarrow propionitrile + isoamyl alcohol.

Schumann, *Ann. phys.*, 1881, **12**, 41.

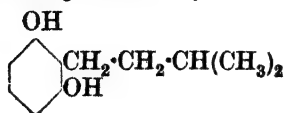
Mailhe, *Bull. soc. chim.*, 1918, **23**, 234.

Schiff, *Ann.*, 1883, **220**, 111.

Isoamylpropionic Acid.

See 2-Methylhexane-5-carboxylic Acid and 5-Methyl-*n*-heptylic Acid.

2-Isoamylresorcinol (*2:6-Dihydroxyisoamylbenzene, tetrahydrotubanol*)

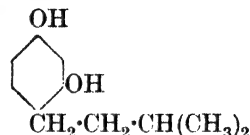


$C_{11}H_{16}O_2$ MW, 180

Cryst. from C_6H_6 -pet. ether. M.p. 85° (83°). *Di-Me ether*: 2:6-dimethoxyisoamylbenzene. $C_{13}H_{20}O_2$. MW, 208. B.p. 102°/1 mm.

Haller, *J. Am. Chem. Soc.*, 1933, **55**, 3032.

4-Isoamylresorcinol (*2:4-Dihydroxyisoamylbenzene*)



$C_{11}H_{16}O_2$ MW, 180

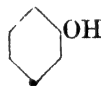
M.p. 68-70° (61-62.5°). B.p. 177-8°/6-7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1692.

Cox, *Rec. trav. chim.*, 1931, **50**, 850.

Dohme, E.P., 219,922, (*Chem. Abstracts*, 1925, **19**, 705).

Isoamyl salicylate



$C_{12}H_{16}O_3$ MW, 208

Liq. with floral odour. Used in perfumery as "orchidée," "trèfle," etc. B.p. 276-7°/743 mm., 151-2°/15 mm. D_{15}^{19} 1.0475. n_D^{20} 1.506. Sol. EtOH, Et₂O, $CHCl_3$. Sol. 0.004% in H₂O at 22°.

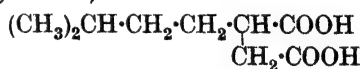
Acetyl: b.p. 174-5°/10 mm. D_4^{19} 1.0835.

Tingle, *Am. Chem. J.*, 1900, **24**, 278.

Lyonnet, *Chem. Zentr.*, 1901, **I**, 414.

Sachse, D.R.P., 288,952, (*Chem. Zentr.*, 1916, **I**, 87).

Isoamylsuccinic Acid (*2-Methylhexane-5:6-dicarboxylic acid*)



$C_9H_{16}O_4$ MW, 188

M.p. 83-4°. Very sol. H₂O, Et₂O, $CHCl_3$, C_6H_6 . Insol. ligroin.

Fittig, Schirmacher, *Ann.*, 1899, **304**, 306.

Lawrence, *Chem. Zentr.*, 1900, **II**, 370.

N-Isoamylthiourea

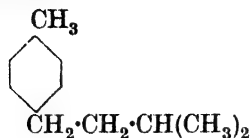


$C_6H_{14}N_2S$ MW, 146

Prisms from EtOH.Aq. M.p. 90-1° (93°). Sol. EtOH. Very spar. sol. H₂O.

Dixon, *J. Chem. Soc.*, 1895, **67**, 559.

p-Isoamyltoluene (p-Methylisoamylbenzene)

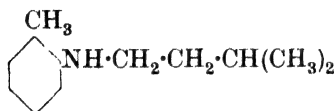


$C_{12}H_{18}$ MW, 162
B.p. 213°. D_4^{20} 0.8643. $CrO_3 \rightarrow$ terephthalic acid.

Kunkell, Ulex, *J. prakt. Chem.*, 1913, **87**, 234.

Bigot, Fittig, *Ann.*, 1867, **141**, 162.

N-Isoamyl-o-toluidine (Isoamyl-o-tolyl-amine)



$C_{12}H_{19}N$ MW, 177
B.p. 240–5°.

Mailhe, *Bull. soc. chim.*, 1919, **25**, 324.

Isoamylurea



$C_6H_{14}ON_2$ MW, 130
Plates from EtOH.Aq. M.p. 94° (150°).
Spar. sol. H_2O .

Curtius, *J. prakt. Chem.*, 1930, **125**, 195.
Bougault, Leboucq, *Bull. soc. chim.*, 1930, **47**, 602.

Isoamylurethane (Ethyl isoamylamino-formate)

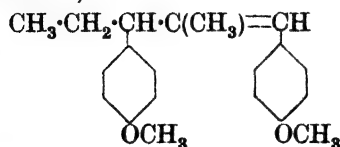


$C_8H_{17}O_2N$ MW, 159
Oil. B.p. 218°, 122–3°/22 mm., 101–2°/14 mm. D_4^{20} 0.9322. n_D^{20} 1.43256.

Custer, *Ber.*, 1879, **12**, 1329.

Schmidt, *Z. physik. Chem.*, 1907, **58**, 516.

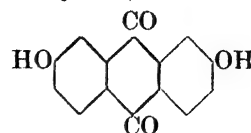
Isoanethole (2-Methyl-1:3-di-[p-methoxy-phenyl]-pentene-1)



$C_{20}H_{24}O_2$ MW, 296

Pale yellow viscous oil. B.p. 205–10°/0.7 mm.
Goodall, Haworth, *J. Chem. Soc.*, 1930, 2482 (*Bibl.*).

Isoanthraflavic Acid (2:7-Dihydroxyanthraquinone, isoanthraflavin)



$C_{14}H_8O_4$ MW, 240

Cryst. + $1H_2O$ from EtOH.Aq. Does not melt below 330°. Sublimes. Sol. EtOH. Mod. sol. AcOH. Very spar. sol. Et_2O , $CHCl_3$, C_6H_6 . Red sols. in alkalis. Bluish-red sol. in conc. H_2SO_4 . KOH fusion \rightarrow anthrapurpurin.

Di-Me ether: $C_{16}H_{12}O_4$. MW, 268. Yellow needles from AcOH. M.p. 215° (209°).

Di-Et ether: $C_{18}H_{16}O_4$. MW, 296. Yellow needles from EtOH. M.p. 193–4°.

Diacetyl: prac. colourless plates from EtOH. M.p. 191°.

Noelting, Wortmann, *Ber.*, 1906, **39**, 641.

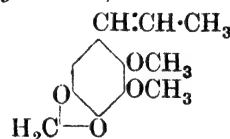
Wedekind, D.R.P., 140,129, (*Chem. Zentr.*, 1903, I, 904).

Schunk, Roemer, *Ber.*, 1876, **9**, 381.

Isoantipyrene.

See 2:5-Dimethyl-1-phenylpyrazolone-3.

Isoapiol (2:3-Dimethoxy-4:5-methylene-dioxy-1-propenylbenzene)



$C_{12}H_{14}O_4$ MW, 222

Occurs in *Crithmum maritimum*. Leaflets or needles from EtOH. F.p. 46°. M.p. 55–6°. B.p. 303–4°, 189°/33 mm. Sol. Et_2O , C_6H_6 , AcOEt, Me_2CO , hot EtOH, hot AcOH. Insol. H_2O .

$C_{12}H_{14}O_4 \cdot C_6H_3(NO_2)_3$ 1:3:5: m.p. 66–7°.

Picrate: m.p. 89–90° (83°).

Delépine, Longuet, *Bull. soc. chim.*, 1926, **39**, 1019.

Ciamician, Silber, *Ber.*, 1896, **29**, 1801.

Bruni, Tornani, *Gazz. chim. ital.*, 1905, **35**, 307.

Isoapoquinidine

$C_{19}H_{22}O_2N_2$ MW, 310

Prisms from EtOH. M.p. 245°. $[\alpha]_D^{21} - 12.6^\circ$ in EtOH.

B,HCl: needles from EtOH. M.p. 255°. $[\alpha]_D^{15} - 40.2^\circ$.

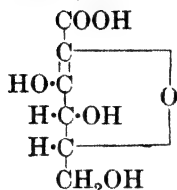
B,HBr: needles from EtOH. M.p. 252°. $[\alpha]_D^{15} - 35.8^\circ$.

$B, 2HBr$: prisms from EtOH. M.p. 280° . $[\alpha]_D^{15} + 18.6^{\circ}$.

B, H_2SO_4 : cryst. from EtOH. M.p. $235-40^{\circ}$ decomp. $[\alpha]_D^{15} + 17.6^{\circ}$.

Henry, Solomon, *J. Chem. Soc.*, 1934, 1929.

Isoascorbic Acid (Isovitamin C)



$C_6H_8O_6$ MW, 176

M.p. 168° . Sol. H_2O , EtOH, Py. Mod. sol. Me_2CO . $[\alpha]_D - 16.3^{\circ}$ in H_2O .

K salt: m.p. 181° . $[\alpha]_D + 91.8^{\circ}$.

Bachstetz, Cavallini, *Z. physiol. Chem.*, 1934, 228, 25.

Maurer, Schiedt, *Ber.*, 1934, 67, 1239.

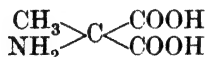
Isoasparagine.

See under Isoaspartic Acid.

Isoasparaginic Acid.

See Isoaspartic Acid.

Isoaspartic Acid (*Isoasparaginic acid*, 1-amino-1-methylmalonic acid, 1-aminoisosuccinic acid)



$C_4H_7O_4N$ MW, 133

Prisms. Explodes at about 250° . Sol. H_2O . Insol. EtOH. Heat. to $100^{\circ} \rightarrow \alpha$ -alanine + CO_2 .

Mono-Me ester: $C_5H_9O_4N$. MW, 147. Needles from MeOH. Insol. Et_2O .

Monoamide: isoasparagine. $C_4H_8O_3N_2$. MW, 132. Cryst. from H_2O . Spar. sol. H_2O . $[\alpha]_D^{15} + 15.5^{\circ}$ in aq. HCl.

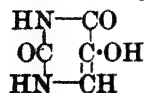
Diamide: $C_4H_8O_2N_3$. MW, 131. Plates from H_2O . Decomp. at $200-1^{\circ}$. Sol. hot H_2O . Spar. sol. EtOH.

Körner, Menozzi, *Gazz. chim. ital.*, 1887, 17, 426, 440.

Lutz, *Chem. Zentr.*, 1910, I, 907.

See also Bergmann, Zervas, *Ber.*, 1932, 65, 1192.

Isobarbituric Acid (5-Hydroxyuracil)



$C_4H_4O_3N_2$

MW, 128

Decomp. on heating. Reduces $AgNO_3$ in cold. $Br \rightarrow$ isodialuric acid.

Monoacetyl deriv.: decomp. at 260° .

Diacetyl deriv.: m.p. 161° .

Biltz, Paetzold, *Ann.*, 1927, 452, 87.

Isobebeerin.

See Isochondrodendrin.

Isobixin (β -Bixin)

$C_{25}H_{30}O_4$ MW, 394

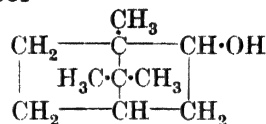
Yellow plates from Me_2CO . M.p. $216-17^{\circ}$ decomp.

Me ester: $C_{26}H_{32}O_4$. MW, 408. M.p. $200-1^{\circ}$.

van Hasselt, *Rec. trav. chim.*, 1911, 30, 1.

Karrer, Helfenstein, Widmer, Itallie, *Helv. Chim. Acta*, 1929, 12, 753.

Isoborneol



$C_{10}H_{18}O$

MW, 154

d-.

Cryst. from pet. ether. M.p. 212° (sealed tube). Sol. EtOH, Et_2O , C_6H_6 , pet. ether, toluene. $[\alpha]_D^{20} - 32.30^{\circ}$ in MeOH.

Formyl: $C_{11}H_{18}O_2$. MW, 182. B.p. $94^{\circ}/15$ mm. $D_4^{20} 1.0136$.

Acetyl: $C_{12}H_{20}O_2$. MW, 196. B.p. $112^{\circ}/17$ mm.

Propionyl: $C_{13}H_{22}O_2$. MW, 210. B.p. $150^{\circ}/13$ mm. ($119^{\circ}/16$ mm.). $D_4^{20} 0.9798$.

Butyryl: $C_{14}H_{24}O_2$. MW, 224. B.p. $123^{\circ}/11$ mm.

Isobutyryl: b.p. $120^{\circ}/14$ mm.

n-Valeryl: $C_{15}H_{26}O_2$. MW, 238. B.p. $136^{\circ}/12$ mm. ($138^{\circ}/14$ mm.).

Lauryl: $C_{22}H_{40}O_2$. MW, 336. B.p. $202^{\circ}/30$ mm.

Acid phthalate: m.p. 167° .

l-.

Cryst. from pet. ether. M.p. 214° (218°). $[\alpha]_D + 33.89^{\circ}$ in EtOH.

Acetyl: b.p. $123-7^{\circ}/35$ mm., $97-105^{\circ}/12$ mm. $D_4^0 1.002$.

Butyryl: b.p. $125^{\circ}/14$ mm.

Isovaleryl: b.p. $143.5-145.5^{\circ}/18$ mm. $D_4^{15} 0.9525$. $n_D^{15} 1.462$.

Acid succinyl: $C_{14}H_{22}O_4$. MW, 254. M.p. $63.5-64.5^{\circ}$.

Benzoyl: $C_{17}H_{22}O_2$. MW, 258. B.p. $185^{\circ}/11$ mm. $D_4^{15} 1.057$. $n_D^{15} 1.529$.

Acid phthalate: $C_{18}H_{22}O_4$. MW, 302. M.p. about 167° decomp.

Et ether: $C_{12}H_{22}O$. MW, 182. B.p. 205–8°, 115–20°/50 mm. D_4^{20} 0.9495. $[\alpha]_D + 26^\circ 31'$.

dl.

Plates from pet. ether. M.p. 212° (sealed tube). Sol. EtOH, Et₂O, CHCl₃. Insol. H₂O.

Formyl: b.p. 106°/19 mm., 100°/14 mm. D_4^{20} 1.010. n_D^{20} 1.47164.

Acetyl: b.p. 106–7°/15 mm. (107°/13 mm.), 102°/12 mm. D_4^{20} 0.9841.

Isobutyryl: b.p. 132–3°/19 mm. D_4^{20} 0.9611.

Isovaleryl: b.p. 132–3°/13 mm. D_4^{20} 0.9506.

Oxalyl: $C_{22}H_{34}O_4$. MW, 362. M.p. 113–14°.

Succinyl: $C_{24}H_{38}O_4$. MW, 390. M.p. 37°.

p-Nitrobenzoyl: $C_{17}H_{21}O_4N$. MW, 303. M.p. 129°.

Me ether: $C_{11}H_{20}O$. MW, 168. B.p. 192–3°, 77°/15 mm. D_4^{18} 0.9235. n_D^{18} 1.46643.

Et ether: b.p. 203–4°. D_4^{18} 0.907.

Isobornyl ether: di-isobornyl ether. $C_{20}H_{34}O$. MW, 290. M.p. 90–1°. B.p. 322°.

Asahina, Ishidate, *Ber.*, 1935, **68**, 555.

Gandini, *Gazz. chim. ital.*, 1934, **64**, 302.

Yamada, Yamada, *J. Chem. Soc. Japan*, 1932, **53**, 807.

Kuwata, Tategai, *Chem. Abstracts*, 1932, **26**, 5552.

Lipp, *Ann.*, 1930, **480**, 298.

Puxeddu, *Gazz. chim. ital.*, 1929, **59**, 59.

Fujita, *Chem. Abstracts*, 1928, **22**, 3406.

Peignier, *Parfums de France*, 1926, **4**, 196.

Vavon, Peignier, *Bull. soc. chim.*, 1926, **39**, 924.

Kenyon, Priston, *J. Chem. Soc.*, 1925, 1472.

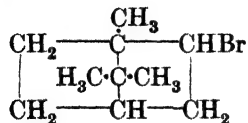
Kahlbaum, D.R.Ps., 573,797, (*Chem. Abstracts*, 1933, **27**, 4243), 576,254, (*ibid.*, 3953.)

Stephan, Ulfers, U.S.Ps., 1,735,750, 1,755,752, (*Chem. Abstracts*, 1930, **24**, 2756).

Isobornylane.

See α -Fenchane.

Isobornyl bromide ("Camphene hydrobromide")



$C_{10}H_{17}Br$

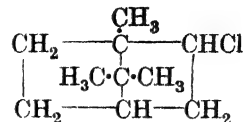
MW, 217

Cryst. from EtOH. M.p. 133°. B.p. 94°/12 mm.

Semmler, *Ber.*, 1900, **33**, 3428.

Pariselle, *Ann. chim.*, 1923, **19**, 119.

Isobornyl chloride (2-Chlorocamphane, "camphene hydrochloride." Note: often wrongly called "bornyl chloride" and "pinene hydrochloride" in the literature)



$C_{10}H_{17}Cl$

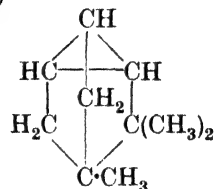
MW, 172.5

Cryst. from amyl alcohol. M.p. 161.5° (149–51°). Sol. Et₂O, pet. ether. Spar. sol. EtOH.

Gandini, *Gazz. chim. ital.*, 1934, **64**, 302.

Meerwein, van Emster, *Ber.*, 1922, **55**, 2526.

Isobornylene (β -Bornylene, isocyclene, β -pericyclocamphane)



$C_{10}H_{16}$

MW, 136

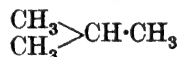
M.p. 117–18°. B.p. 150–2° (150–1°/743 mm.).

Bredt, Holz, *J. prakt. Chem.*, 1917, **95**, 151.

Iso-2-bromo-1-methylacrylic Acid.

See under 2-Bromo-1-methylacrylic Acid.

Isobutane (Trimethylmethane)



C_4H_{10}

MW, 58

M.p. – 145°. B.p. – 10.2°. Sol. EtOH, Et₂O, CHCl₃. Spar. sol. H₂O. Heat of comb. C_p 687.19 Cal.

Coffin, Maass, *J. Am. Chem. Soc.*, 1920, **50**, 1427.

Isobutane-1 : 3-dialdehyde.

See 2-Methylglutaraldehyde.

Isobutane-1 : 1-dicarboxylic Acid.

See Isopropylmalonic Acid.

Isobutane-1 : 3-dicarboxylic Acid.

See 2-Methylglutaric Acid.

Isobutane-tricarboxylic Acid.

See 2-Methyltricarballic Acid and Methane-triacetic Acid.

Isobutylacetaldehyde.

See Isocaproic Aldehyde.

N-Isobutylacetamide (Acetylisobutylamine)



$C_6H_{13}ON$

MW, 115

B.p. 227°. Sol. H₂O.

B, HCl: m.p. 107°.

Titherley, *J. Chem. Soc.*, 1901, **79**, 402.

Naegeli, Grüntuch, Lendorff, *Helv. Chim.*

Acta, 1929, **12**, 249.

p-Isobutylacetanilide.

See under p-Isobutylaniline.

Isobutyl acetate



C₈H₁₂O₂

MW, 116

F.p. — 98·85°. B.p. 118°. D₄²⁰ 0·8712. n_D^{18·75} 1·39066.

Hückel, Ackermann, *J. prakt. Chem.*, 1933, **136**, 23.

Isobutylic acid.

See Isocaproic Acid.

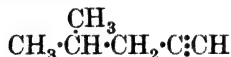
Isobutylic acetone.

See Methyl isoamyl Ketone.

Isobutyl acetonyl Ether.

See under Hydroxyacetone.

Isobutylicetylene (4-Methylpentene-1)



C₆H₁₀

MW, 82

M.p. — 105·1°. B.p. 61·1–61·2°. D₄¹⁵ 0·7092. n_D¹⁵ 1·3936.

van Riesen, *Bull. soc. chim. Belg.*, 1933, **42**, 229.

2-Isobutylacrylic Acid.

See 1-Isheptenic Acid.

Isobutyl Alcohol (Isopropylcarbinol, 1-hydroxyisobutane)



C₄H₁₀O

MW, 74

B.p. 108·1°, 106·6°/737 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O. D₁₅¹⁵ 0·80576. n_D¹⁵ 1·39768. Forms add. comp. with CaCl₂, (CaCl₂, 3C₄H₁₀O).

Acid phthalate: m.p. 68°.

Phenylurethane: m.p. 86°.

2-Naphthylurethane: m.p. 103–5°.

Me ether: see Methyl isobutyl Ether.

Et ether: see Ethyl isobutyl Ether.

Propyl ether: see Propyl isobutyl Ether.

Butyl ether: C₈H₁₈O. MW, 130. B.p. 131·5–132°, 43°/26·3 mm. (25·4°/9·5 mm.). n_D^{17·5} 1·3968.

Isobutyl ether: see Di-isobutyl Ether.

Phenyl ether: see Isobutyl phenyl Ether.

I.G., E.P., 324,897, (*Chem. Abstracts*, 1930, **24**, 3802).

Hückel, Ackermann, *J. prakt. Chem.*, 1933, **136**, 22.

Isobutylallene.

See 5-Methyl-1 : 2-hexadiene.

3-Isobutylallyl Alcohol.

See 5-Methyl-2-hexenol-1.

Isobutylallylamine



C₇H₁₅N

MW, 113

B.p. 123°. Sol. H₂O.

B, HCl: m.p. 216°.

B, HBr: m.p. 222°.

B, HAuCl₄: m.p. 140°.

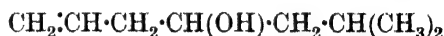
B₂, H₂PtCl₆: m.p. 182°.

B, (COOH)₂: m.p. 221°.

Paal, Heupel, *Ber.*, 1891, **24**, 3043.

Isobutylallylcarbinol (6-Methyl-1-heptenol-

4)



C₈H₁₆O

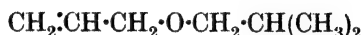
MW, 128

B.p. 162°. D₄²¹ 0·834.

Acetyl: b.p. 179°. D₆²⁰ 0·871.

Wagner, *Ber.*, 1894, **27**, 2435.

Isobutyl allyl Ether



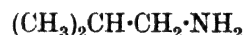
C₇H₁₄O

MW, 114

B.p. 108–10°.

Maihle, Godon, *Bull. soc. chim.*, 1920, **27**, 329.

Isobutylamine (1-Aminoisobutane)



C₄H₁₁N

MW, 73

B.p. 68·9°. Sol. H₂O. D₄²⁵ 0·724. n_D¹⁷ 1·39878. Heat of comb. C_p (liq.) 714·1 Cal., C_v (liq.) 712·8 Cal.

B, HCl: m.p. 177–8° (164°).

B, HBr: m.p. 138°.

B, HAuBr₄: m.p. 154°.

B₂, H₂PtCl₆: decomp. at 225° (230–2°).

Hydrate: C₄H₁₁N, H₂O. MW, 91. M.p. 74°.

Sublimes.

N-Formyl: b.p. 111°/12 mm. D₄²⁰ 0·9105. n_D²⁰ 1·43786.

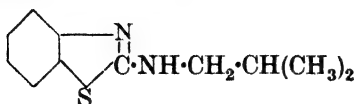
N-Acetyl: see Isobutylicetamide.

N-Phenyl: see Isobutylicaniline.

Taipale, *Chem. Abstracts*, 1925, **19**, 3478.

Naegeli, Grüntuch, Lendorff, *Helv. Chim. Acta*, 1929, **12**, 248.

2-Isobutylaminobenzthiazole (1-Isobutylaminobenzthiazole. See Note under 2-Aminobenzthiazole)



$C_{11}H_{14}N_2S$ MW, 206

Needles from EtOH. M.p. 103–4°.

Hunter, *J. Chem. Soc.*, 1926, 2956.

Isobutylaminoethyl Alcohol (N-2-Hydroxyethylisobutylamine, isobutylethanolamine)



$C_6H_{15}ON$ MW, 117

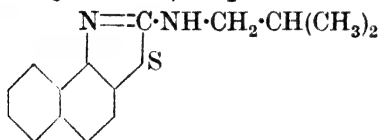
Oil. B.p. 190°/756 mm. D_4^{20} 0.8818. n_D^{20} 1.4402. Sol. H_2O , EtOH, Et_2O .

Picrate: cryst. from H_2O . M.p. 115–17°. Sol. EtOH.

Picronate: leaflets from EtOH.Aq. M.p. 232° decomp.

Matthes, *Ann.*, 1901, 315, 119.

2-Isobutylamino-β-naphthathiazole



$C_{15}H_{16}N_2S$ MW, 256

Cryst. from MeOH. M.p. 71°.

Dyson, Hunter, Morris, *J. Chem. Soc.*, 1932, 2283.

Isobutyl-n-amylcarbinol (2-Methylnonanol-4)



$C_{10}H_{22}O$ MW, 158

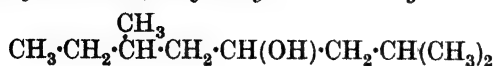
d.

B.p. 117°/40 mm. n_D^{25} 1.4302. $[\alpha]_D^{30} + 7.22^\circ$.

Acid phthalate: $[\alpha]_D^{30} + 11.9^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1931, 90, 669.

Isobutyl-activeamylcarbinol (2:6-Dimethyloctanol-4, 4-hydroxy-2:6-dimethyloctane)

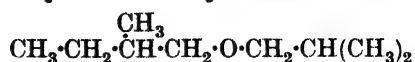


$C_{10}H_{22}O$ MW, 158

B.p. 195°. $D^{15.5}$ 0.8230. n_D^{20} 1.4270.

Jones, Smith, *J. Chem. Soc.*, 1925, 2535.

Isobutyl active-amyl Ether

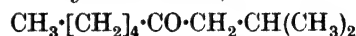


$C_9H_{20}O$ MW, 144

B.p. 145–7°/729.5 mm. D_4^{22} 0.773. $n_D^{20.2}$ 1.4008. $[\alpha]_D^{22} + 0.96^\circ$.

Guye, Chavanne, *Bull. soc. chim.*, 1896; 15, 304.

Isobutyl n-amyl Ketone (4-Keto-2-methylnonane, 2-methylnonanone-4)

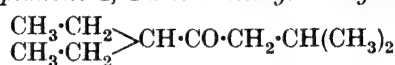


$C_{10}H_{20}O$ MW, 156

B.p. 206–9°. D_4^{20} 0.8185.

Lowry, *J. Chem. Soc.*, 1914, 105, 92.

Isobutyl sec.-n-amyl Ketone (2-Methyl-5-ethylheptanone-4, 4-keto-2-methyl-5-ethylheptane)

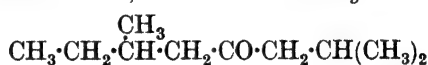


$C_{10}H_{20}O$ MW, 156

B.p. 188–92°.

Kanao, Yaguchi, *Chem. Abstracts*, 1928, 22, 3407.

Isobutyl active-amyl Ketone (2:6-Dimethyloctanone-4, 4-keto-2:6-dimethyloctane)



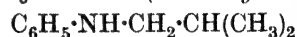
$C_{10}H_{20}O$ MW, 156

B.p. 187°. $D^{15.5}$ 0.8190. n_D^{20} 1.4190.

Semicarbazone: m.p. 91–5°.

Jones, *J. Chem. Soc.*, 1926, 2769.

N-Isobutyraniline (N-Phenylisobutylamine)



$C_{10}H_{15}N$ MW, 149

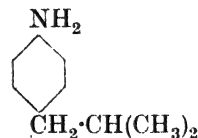
B.p. 225–7°, 109–10°/13 mm. D_4^{18} 0.940.

N-p-Toluenesulphonyl: m.p. 122–3°.

Hickinbottom, *J. Chem. Soc.*, 1930, 994.

Lazier, Adkins, *J. Am. Chem. Soc.*, 1924, 46, 741.

p-Isobutyraniline (3-p-Aminophenylisobutane)



$C_{10}H_{15}N$ MW, 149

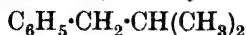
Pale yellow liq. B.p. 235–6°/762 mm. Sol. ord. org. solvents. Insol. H_2O .

N-Acetyl: *p*-isobutylacetanilide. $C_{12}H_{17}ON$.
MW, 191. M.p. 127–8°.

N-p-Toluenesulphonyl: m.p. 136–7°.

Hickinbottom, Preston, *J. Chem. Soc.*,
1930, 1569.

Isobutylbenzene (1-Phenylisobutane)

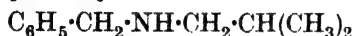


$C_{10}H_{14}$ MW, 134

B.p. 167° (169.5°). D_4^{20} 0.86726. $n_D^{14.5}$ 1.4957.
 $CrO_3 \rightarrow$ benzoic acid.

Späth, *Monatsh.*, 1913, **34**, 1988.

Isobutylbenzylamine



$C_{11}H_{17}N$ MW, 163

B.p. 217–20°/741 mm.

B, HCl: m.p. 175°.

B, HI: m.p. 165–6°.

Zaunschirm, *Ann.*, 1888, **245**, 283.

Jones, *J. Chem. Soc.*, 1903, **83**, 1414.

Isobutyl benzyl Ether



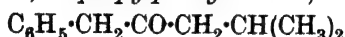
$C_{11}H_{16}O$ MW, 164

B.p. 212.5°/744 mm. D_4^{10} 0.9250.

Claus, Trainer, *Ber.*, 1886, **19**, 3006.

Senderens, *Compt. rend.*, 1924, **178**, 1415.

Isobutyl benzyl Ketone (2-Methyl-5-phenyl-pentanone-4, isopropylphenylacetone)



$C_{12}H_{16}O$ MW, 176

Yellow liq. B.p. 250.5°, 122°/15 mm. D_4^0 0.969.

Semicarbazone: m.p. 80°.

Phenylhydrazone: m.p. 67°.

Senderens, *Compt. rend.*, 1910, **150**, 1338.

Ogata, *Chem. Abstracts*, 1918, **12**, 41.

Ivanoff, Nicoloff, *Bull. soc. chim.*, 1932,
51, 1334.

Isobutyl bromide (1-Bromoisobutane)



C_4H_9Br MW, 137

B.p. 90.5–91°/766 mm., 41–3°/135 mm. D_4^{15} 1.27197. n_D^{15} 1.43914.

Longinov, Lerman, *Chem. Abstracts*, 1933,
27, 3443.

Hückel, Ackermann, *J. prakt. Chem.*,
1933, **136**, 24.

Noller, Dinsmore, *Organic Syntheses*, 1933,
XIII, 20.

1-Isobutyl-1 : 3-butadiene.

See 6-Methyl-1 : 3-heptadiene.

Isobutyl γ -butenyl Ketone.

See 7-Methyl-1-octenone-5.

Isobutylbutyric Acid.

See 2-Methylhexane-4-carboxylic Acid and
5-Methyl-*n*-heptylic Acid.

Isobutylcarbinol.

See Isoamyl Alcohol.

Isobutyl chloride (1-Chloroisobutane)



C_4H_9Cl MW, 92.5

B.p. 68.8°. D_4^{15} 0.8829. n_D^{15} 1.40096. Heat
of comb. C_p 650.1 Cal.

Underwood, Gale, *J. Am. Chem. Soc.*,
1934, **56**, 2119.

Michael, Zeidler, *Ann.*, 1912, **393**, 110.

Isobutyl cyanide.

See under Isovaleric Acid.

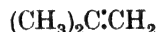
Isobutylcyanoacetic Ester.

See under Isobutylmalonic Acid.

Isobutyl 2 : 4-dihydroxyphenyl Ketone.

See 4-Isovalerylresorcinol.

Isobutylene (1 : 1-Dimethylethylene, γ -butyl-ene, 2-methylpropylene)



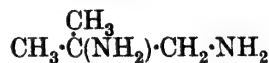
C_4H_8 MW, 56

Gas at ord. temps. Liquefies in freezing
mixture. B.p. –6.6°.

Coffin, Maass, *J. Am. Chem. Soc.*, 1928,
50, 1427.

Krestinsky, *Ber.*, 1922, **55**, 2755.

Isobutylenediamine (2-Methylpropylenediamine, 1 : 2-diaminoisobutane)



$C_4H_{12}N_2$ MW, 88

Hydrochloride: plates from EtOH.Aq. M.p.
303°.

B, H₂SO₄: prisms. M.p. above 300°.

Diacetyl: needles from AcOEt. M.p. 100°.

Dibenzoyl: cryst. from 80% EtOH. M.p.
182.5° (sinters at 180°). Very sol. Py. Spar.
sol. H₂O.

Di-m-nitrobenzoyl: cryst. from EtOH. M.p.
174°.

B, 2AuCl₃: m.p. 228°.

B, 2HAuCl₄, 2½H₂O: m.p. 135°, anhyd. 233°.

Chloroplatinate: m.p. 270°.

HgCl₂ double salt: m.p. 151–2°.

Picrate: m.p. anhyd. 241°.

Picrolonate: sinters at 256°, decomp. at 260–2°.

Drew, Head, *J. Chem. Soc.*, 1934, 49.
Strack, Schwaneberg, *Ber.*, 1933, 66, 1333.

Isobutylene dibromide.

See 1:2-Dibromoisobutane.

Isobutylene-1:3-dicarboxylic Acid.

See β -Methylglutaconic Acid.

Isobutylene dichloride.

See 1:2-Dichloroisobutane.

Isobutylene Glycol (1:2-Dihydroxyisobutane, 1:1-dimethylethylene glycol)



$\text{C}_4\text{H}_{10}\text{O}_2$ MW, 90

B.p. 177°. D_4^{20} 1.003. Heat + H_2O at 180–200° \rightarrow isobutyraldehyde.

1:2-Diacetyl: $\text{C}_8\text{H}_{14}\text{O}_4$. MW, 174. B.p. 190–1°.

1-Et ether: $\text{C}_6\text{H}_{14}\text{O}_2$. MW, 118. B.p. 129°. D_4^{15} 0.8786. n_D^{20} 1.40624. Mod. sol. H_2O .

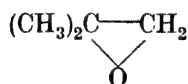
Dolgorukova-Dobryanska, *Chem. Abstracts*, 1926, 20, 2311.

Henry, *Compt. rend.*, 1907, 144, 1405.

Béhal, Sommelet, *Bull. soc. chim.*, 1904, 31, 302.

Wagner, *Ber.*, 1888, 21, 1232.

Isobutylene oxide



$\text{C}_4\text{H}_8\text{O}$ MW, 72

B.p. 52°. D_4^0 0.865. Heat above 210° + Al_2O_3 or $\text{PbCl}_2 \rightarrow$ isobutyraldehyde. With H_2O + trace conc. $\text{H}_2\text{SO}_4 \rightarrow$ isobutylene glycol. With 33% NH_3 . Aq. \rightarrow 1-amino-2-methylpropanol-2.

Schoeller et al., U.S.P., 1,967,433, (*Chem. Abstracts*, 1934, 28, 5832).

Finkelstein, Canadian P., 285,920, (*Chem. Abstracts*, 1929, 23, 1138).

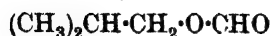
Fourneau, Tiffeneau, *Compt. rend.*, 1907, 145, 438.

Riedel, D.R.P., 199,148, (*Chem. Zentr.*, 1908, II, 121).

Isobutylethylene.

See 4-Methyl-1-pentene.

Isobutyl formate



$\text{C}_5\text{H}_{10}\text{O}_2$ MW, 102

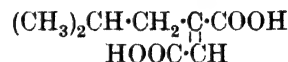
B.p. 98.2°, 77.1°/380 mm., 60.2°/201 mm., 32.8°/54 mm. D_4^{20} 0.88535. n_D^{20} 1.38568.

I.G., D.R.P., 490,250, (*Chem. Abstracts*, 1930, 24, 2141).

Mathews, Faville, *J. Phys. Chem.*, 1918, 22, 1.

Sabatier, Mailhe, *Compt. rend.*, 1911, 152, 1045.

Isobutylfumaric Acid (*Isopropylmesaconic acid*)



$\text{C}_8\text{H}_{12}\text{O}_4$ MW, 172

Leaflets from H_2O . M.p. 185°. Very sol. EtOH , Et_2O , boiling H_2O . $k = 9.3 \times 10^{-4}$ at 25°.

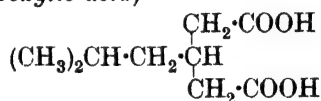
Et ester-amide: $\text{C}_{10}\text{H}_{17}\text{O}_3\text{N}$. MW, 199. Needles. M.p. 87°.

Diamide: $\text{C}_8\text{H}_{14}\text{O}_2\text{N}_2$. MW, 170. Leaflets. M.p. 250–2° decomp.

Demarçay, *Ann. chim.*, 1880, 20, 493.

Walden, *Ber.*, 1891, 24, 2038.

2-Isobutylglutaric Acid (2-Isobutylpropane-1:3-dicarboxylic acid)



$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Needles from H_2O . M.p. 48°. B.p. 205°/12 mm. Very sol. Et_2O , EtOH , C_6H_6 , AcOH , H_2O . Mod. sol. CS_2 , ligroin.

Di-Et ester: $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. B.p. 262–3°.

Knoevenagel, *Ber.*, 1898, 31, 2590;

D.R.Ps., 156,560, 161,171, (*Chem. Zentr.*, 1905, I, 56; II, 179).

Isobutylglyoxylic Acid.

See 1-Ketoisocaproic Acid.

Isobutyl *p*-hydroxyphenyl Ketone.

See *p*-Hydroxyisovalerophenone.

Isobutylideneacetic Acid.

See 2-Isopropylacrylic Acid.

Isobutylideneacetone (5-Keto-2-methyl-hexene-3, 2-methyl-3-hexenone-5, 1-acetoisopentene)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Cis:

B.p. 64°/18 mm. D_4^{20} 0.8558. n_D^{20} 1.4374.

Semicarbazone: m.p. 160°.

Trans :

B.p. 63–5°/20 mm. D_4^{20} 0.8407. n_D^{20} 1.4395.

Semicarbazone : m.p. 126°.

Eccott, Linstead, *J. Chem. Soc.*, 1930, 909.

Cf. Heilmann, *Bull. soc. chim.*, 1931, 49, 75.

3-Isobutylidenebutyrlic Acid.

See 5-Methyl-3-heptenic Acid.

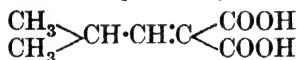
Isobutylidene chloride.

See 1:1-Dichloroisobutane.

Isobutylidene-ethylene.

See 4-Methyl-1:2-pentadiene.

Isobutylidene-malonic Acid (3-Methyl-1-butylene-1:1-dicarboxylic acid)



$\text{C}_7\text{H}_{10}\text{O}_4$ MW, 158

Di-Et ester : $\text{C}_9\text{H}_{14}\text{O}_4$. MW, 186. B.p. 128–132°/23 mm.

Schryver, *J. Chem. Soc.*, 1893, 63, 1344.

2-Isobutylidene-propionic Acid.

See 2-Isheptenic Acid.

Isobutyl iodide (1-Iodoisobutane)



$\text{C}_4\text{H}_9\text{I}$ MW, 184

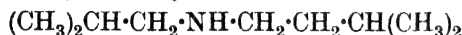
B.p. 120°, 83°/250 mm. D_4^{20} 1.605, D_4^{15} 1.6139. n_D^{20} 1.49597.

Brauner, *Ann.*, 1878, 192, 69.

Perkin, *J. prakt. Chem.*, 1885, 31, 503.

Hirao, *J. Chem. Soc. Japan*, 1931, 52, 269, (*Chem. Abstracts*, 1932, 26, 5062).

Isobutylisoamylamine



$\text{C}_9\text{H}_{21}\text{N}$ MW, 143

B.p. 158–60°.

Sabatier, Mailhe, *Compt. rend.*, 1909, 148, 900.

Isobutyl isocyanate



$\text{C}_5\text{H}_9\text{ON}$ MW, 99

Colourless mobile pungent liq. B.p. 101.5°.

Anschütz, *Ann.*, 1908, 359, 213.

Isobutyl isocyanide (Isobutyl carbylamine)



$\text{C}_5\text{H}_9\text{N}$ MW, 83

B.p. 110–11° (114–17°). D_4^{20} 0.7873. Heat of comb. C_p 916.4 (795.0) Cal.

Gautier, *Ann. chim.*, 1869, 17, 245.

Guillemard, *Ann. chim.*, 1908, 14, 413.

Isobutyl isothiocyanate (Isobutyl mustard oil)



$\text{C}_5\text{H}_9\text{NS}$ MW, 115

B.p. 162°. D_4^{14} 0.9638. n_D^{14} 1.5005.

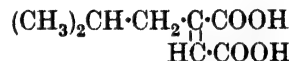
Delépine, *Compt. rend.*, 1907, 144, 1126;

Bull. soc. chim., 1908, 3, 642; *Ann. chim.*, 1912, 25, 560.

Isobutylisovalerylcarbinol.

See Isovaleroin.

Isobutylmaleic Acid (Isopropylcitric acid)

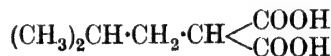


$\text{C}_8\text{H}_{12}\text{O}_4$ MW, 172

Needles or prisms from CHCl_3 -ligroin. M.p. 78–81° \rightarrow oily anhydride. Very sol. H_2O . EtOH, Et₂O. Sol. CHCl_3 . Insol. ligroin.

Fittig, *Ann.*, 1899, 304, 262, 292.

Isobutylmalonic Acid (Isopentane-4:4-dicarboxylic acid, 3-methylbutane-1:1-dicarboxylic acid)



$\text{C}_7\text{H}_{12}\text{O}_4$ MW, 160

Cryst. from C_6H_6 . M.p. 108°. Decomp. at 115°. Sol. H_2O , EtOH, Et₂O. $k = 1.01 \times 10^{-3}$ at 25°. Heat \rightarrow isobutylacetic acid.

Di-Me ester : $\text{C}_9\text{H}_{16}\text{O}_4$. MW, 188. B.p. 211°/763 mm., 101°/15 mm.

Di-Et ester : $\text{C}_{11}\text{H}_{20}\text{O}_4$. MW, 216. B.p. 119–20°/16 mm.

Dichloride : $\text{C}_7\text{H}_{10}\text{O}_2\text{Cl}_2$. MW, 197. B.p. 83–5°/22 mm.

Diamide : $\text{C}_7\text{H}_{14}\text{O}_2\text{N}_2$. MW, 158. Needles from EtOH. M.p. 195–6°.

Di-nitrile : $\text{C}_7\text{H}_{10}\text{O}_2$. MW, 126. B.p. 222°.

Et ester-nitrile : isobutylcyanoacetic ester, 1-cyanoisocaproic ethyl ester. $\text{C}_9\text{H}_{15}\text{O}_2\text{N}$. MW, 169. B.p. 223–4°/755 mm., 127–32°/35–42 mm.

Marshall, *Rec. trav. chim.*, 1932, 51, 236.

Freydon, *Ann. chim.*, 1910, 20, 59.

Hessler, *J. Am. Chem. Soc.*, 1916, 38, 912.

Isobutyl Mercaptan (1-Mercaptoisobutane, thioisobutyl alcohol)



$\text{C}_4\text{H}_{10}\text{S}$ MW, 90

B.p. 88°. D_4^{20} 0.8357. n_D^{20} 1.4386.

Hg salt : m.p. 94–5°.

N-Isobutyl-3 : 4-methylenedioxy-cinnamic Amide 417

3 : 5-Dinitrobenzoyl : m.p. 63-4°.

Nasini, *Ber.*, 1882, **15**, 2882.

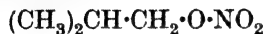
Sabatier, Mailhe, *Compt. rend.*, 1910, **150**, 1219.

Mereshkowski, *Chem. Zentr.*, 1915, **I**, 982.

N-Isobutyl-3 : 4-methylenedioxy-cinnamic Amide.

See Fagaramide.

Isobutyl nitrate



$\text{C}_4\text{H}_9\text{O}_3\text{N}$ MW, 119

B.p. 123.5-124.5°. D_4^{20} 1.0152. n_D^{20} 1.4028.

Perkin, *J. Chem. Soc.*, 1889, **55**, 683.

Löwenherz, *Ber.*, 1890, **23**, 2191.

Isobutyl nitrite



$\text{C}_4\text{H}_9\text{O}_2\text{N}$ MW, 103

B.p. 67°. D_4^{22} 0.8699. n_D^{22} 1.3715.

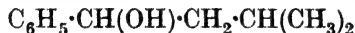
Mailhe, Bellegarde, *Bull. soc. chim.*, 1919, **25**, 590.

Neogi, *J. Chem. Soc.*, 1914, **105**, 2375.

Isobutylphenylacetic Acid.

See 1-Phenylisocaproic Acid.

Isobutylphenylcarbinol (4-Hydroxy-2-methyl-4-phenylbutane, α -hydroxyisoamylbenzene)



$\text{C}_{11}\text{H}_{16}\text{O}$ MW, 164

Viscous oil. B.p. 235-6°/746 mm., 126°/21 mm., 122°/9 mm. D_4^{16} 0.9597. n_D^{16} 1.50798.

Acetyl : $\text{C}_{13}\text{H}_{18}\text{O}_2$. MW, 206. B.p. 125-6°/9 mm.

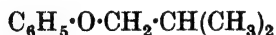
Grignard, *Ann. chim.*, 1901, **24**, 467.

Klages, *Ber.*, 1904, **37**, 2316.

Schorigen, *Ber.*, 1907, **40**, 3117.

Tiffeneau, *Ann. chim.*, 1907, **10**, 354.

Isobutyl phenyl Ether



$\text{C}_{10}\text{H}_{14}\text{O}$ MW, 150

B.p. 196° (200°). D_{15}^{24} 0.9240. n_D^{24} 1.4932. Decomp. at 380-400° \rightarrow phenol + an unsaturated hydrocarbon.

Smith, *J. Am. Chem. Soc.*, 1934, **56**, 717.

Bamberger, *Ber.*, 1886, **19**, 1820.

Isobutyl phenyl Ketone.

See Isovalerophenone.

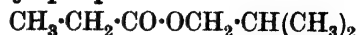
Isobutylpropenylcarbinol.

See 6-Methyl-2-heptenol-4.

Dict. of Org. Comp.—II.

Isobutyl thiocyanate

Isobutyl propionate



$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

B.p. 137°. D_4^0 0.8876. Vapour passed over thoria at 470-80° \rightarrow propionitrile.

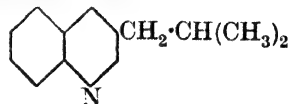
Pierre, Puchot, *Ann.*, 1872, **163**, 283.

Mailhe, *Bull. soc. chim.*, 1918, **23**, 234.

1-Isobutylpropylene.

See 5-Methyl-2-hexene.

3-Isobutylquinoline



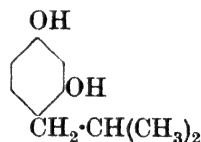
$\text{C}_{12}\text{H}_{15}\text{N}$ MW, 173

B.p. 114°/2 mm.

Picrate : m.p. 160°.

Darzens, Meyer, *Compt. rend.*, 1934, **198**, 1428.

4-Isobutylresorcinol (2 : 4-Dihydroxyisobutylbenzene)



$\text{C}_{10}\text{H}_{14}\text{O}_2$ MW, 166

M.p. 62-63.5°. B.p. 166-8°/6-7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1692.

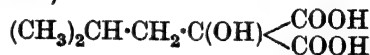
Dohme, E.P., 219,922, (*Chem. Abstracts*, 1925, **19**, 705).

Cox, *Rec. trav. chim.*, 1931, **50**, 850.

β -Isobutylstyrene.

See 4-Methyl-1-phenyl-1-pentene.

Isobutyltartronic Acid (Isobutylhydroxymalonic acid)



$\text{C}_7\text{H}_{12}\text{O}_5$ MW, 176

Deliquescent plates. M.p. 110-14° (107°) decomp. Sol. H_2O , Et_2O , EtOH . Spar. sol. C_6H_6 , pet. ether. Heat at 180° \rightarrow 1-hydroxyisocaproic acid.

Plattner, *Monatsh.*, 1915, **36**, 903.

Guthzeit, *Ann.*, 1881, **209**, 237.

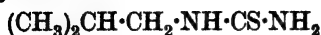
Isobutyl thiocyanate



$\text{C}_5\text{H}_9\text{NS}$ MW, 115

B.p. 174-6°.

Hofmann, Reimer, *Ber.*, 1870, **3**, 757.

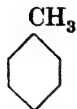
Isobutylthiourea

$\text{C}_5\text{H}_{12}\text{N}_2\text{S}$ MW, 132

Cryst. M.p. 93.5°.

Hofmann, *Ber.*, 1874, 7, 511.

p-Isobutyltoluene (1-Methyl-4-isobutylbenzene)



$\text{C}_{11}\text{H}_{16}$ MW, 148

B.p. 196-7°. D_4^{20} 0.864. n_D^{20} 1.4917.

Wallach, Berthold, *Chem. Zentr.*, 1915, II, 825.

N-Isobutyl-o-toluidine (o-Tolylisobutylamine)



$\text{C}_{11}\text{H}_{17}\text{N}$ MW, 163

B.p. 230-5°/758 mm.

Bischoff, *Ber.*, 1897, 30, 2466.

N-Isobutyl-p-toluidine (p-Tolylisobutylamine).

B.p. 135°/19 mm.

Wedekind, Bruch, *Ann.*, 1929, 471, 100.

Cf. Lazier, Adkins, *J. Am. Chem. Soc.*, 1924, 46, 741.

Isobutyl-o-tolyl Ketone (2-Isovaleryltoluene, o-methylisovalerophenone)



$\text{C}_{12}\text{H}_{16}\text{O}$ MW, 176

B.p. 247.5°/758 mm. D_4^{20} 0.9744.

Semicarbazone : m.p. 166°.

Senderens, *Ann. chim.*, 1913, 28, 333 ;
Bull. soc. chim., 1911, 9, 950.

Isobutylm-tolyl Ketone (3-Isovaleryltoluene, m-methylisovalerophenone).

B.p. 254°/758 mm. D_4^{20} 0.9712.

Semicarbazone : m.p. 172°.

See previous references.

Isobutyl p-tolyl Ketone (4-Isovaleryltoluene, p-methylisovalerophenone).

B.p. 259°/758 mm. D_4^{20} 0.9707.

Semicarbazone : m.p. 212°.

Oxime : cryst. from EtOH. M.p. 65°.

Willgerodt, Hambrecht, *J. prakt. Chem.*, 1910, 81, 83.

See also previous references.

Isobutylurea

$\text{C}_5\text{H}_{12}\text{ON}_2$ MW, 116

Needles from Me_2CO . M.p. 141°. Spar. sol. Me_2CO , C_6H_6 .

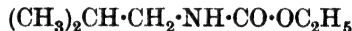
Nitrate : cryst. from EtOH. M.p. 94-8°.

N-Acetyl : leaflets. M.p. 109-114°. Sol. EtOH, Et_2O . Spar. sol. cold H_2O .

Odenwald, *Ann.*, 1919, 418, 331.

Dixon, *J. Chem. Soc.*, 1895, 67, 559.

Isobutylurethane (Ethyl isobutylaminoformate)



$\text{C}_7\text{H}_{16}\text{O}_2\text{N}$ MW, 145

Liq. with apple-like odour. B.p. 96°/17 mm. D_4^{20} 0.9432. n_D^{20} 1.4288. Upon ingestion causes headache and vomiting.

van Erp, *Rec. trav. chim.*, 1895, 14, 20.

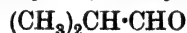
Curtius, Hille, *J. prakt. Chem.*, 1901, 64, 416.

Isobutylvinylcarbinol.

See 5-Methyl-1-hexenol-3.

Isobutyl vinyl Ketone.

See 5-Methyl-1-hexenone-3.

Isobutyraldehyde (Isobutyric aldehyde)

$\text{C}_4\text{H}_8\text{O}$ MW, 72

Pungent liq. B.p. 63-4°/757 mm. D_4^{20} 0.7938. n_D^{20} 1.3730. Heat of comb. C_p 599.9 Cal. Sol. 9 vols. H_2O at 20°. Oxidises in air, rapidly in presence of Pt black \rightarrow isobutyric acid. NaHg in aq. sol. \rightarrow isobutyl alcohol. Vapour + NH_3 passed over thoria at 420-40° \rightarrow isobutyronitrile. Forms spar. sol. bisulphite comp. Di-Et acetal : $\text{C}_8\text{H}_{18}\text{O}_2$. MW, 146. B.p. 134-6°. D^{19} 0.9957.

Oxime : liq. B.p. 140°.

Semicarbazone : m.p. 125-6° (121°).

Phenylsemicarbazone : m.p. 133-4°.

Phenylhydrazone : liq. B.p. 145°/20 mm.

p-Nitrophenylhydrazone : m.p. 130°.

2 : 4-Dinitrophenylhydrazone : m.p. 187°.

3-Nitrobenzoylhydrazone : rectangular plates. M.p. 141-2°.

4-Chlorobenzoylhydrazone : prismatic needles. M.p. 153-4°.

Cyanhydrin: see under 1-Hydroxyisovaleric Acid.

- Lipp, *Ann.*, 1880, **205**, 2.
 Fosseck, *Monatsh.*, 1883, **4**, 660.
 Sabatier, Mailhe, *Ann. chim.*, 1910, **20**, 303; *Compt. rend.*, 1912, **154**, 563.
 Tiffeneau, *Compt. rend.*, 1910, **150**, 1183.
 Harries, Oppenheim, *Chem. Zentr.*, 1916, **II**, 992.
 I.G., E.P., 354,388, (*Chem. Abstracts*, 1932, **26**, 5310).
 Sah et al., *Chem. Zentr.*, 1935, **I**, 56; *Chem. Abstracts*, 1934, **28**, 3713.

Isobutyric Acid



MW, 88

The free acid or its esters occur in many plants. M.p. -47° . B.p. 154.3° . D_4^{20} 0.9504. n_D^{20} 1.3930. $k = 1.4 (1.62) \times 10^{-5}$ at 25° . Vapour passed over thoria at $400-30^\circ \rightarrow$ di-isopropyl ketone. Alk. $\text{KMnO}_4 \rightarrow$ 1-hydroxyisobutyric acid. H_2O_2 on Na salt in aq. sol. \rightarrow acetone. Hot $\text{HNO}_3 \rightarrow$ 2:2-dinitropropane. The salts are more sol. H_2O than those of the *n*-acid.

Me ester: see Methyl isobutyrate.

Et ester: see Ethyl isobutyrate.

Propyl ester: $\text{C}_7\text{H}_{14}\text{O}_2$. MW, 130. B.p. 134° . D_4^{20} 0.8843.

Isopropyl ester: b.p. 120.8° . D_4^{20} 0.8687.

Isobutyl ester: $\text{C}_8\text{H}_{16}\text{O}_2$. MW, 144. B.p. 147° . D_4^{20} 0.8749.

Amyl ester: see active Amyl isobutyrate and *tert.*-Amyl isobutyrate.

Isoamyl ester: see Isoamyl isobutyrate.

Allyl ester: $\text{C}_7\text{H}_{12}\text{O}_2$. MW, 128. B.p. $133.5^\circ/766$ mm.

Benzyl ester: $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. B.p. 229° . D^{25} 1.0058.

Glycerol esters: see Mono-isobutyryl, Di-isobutyryl, and Tri-isobutyryl.

p-Bromophenacyl ester: m.p. 76.8° .

Anhydride: $\text{C}_8\text{H}_{14}\text{O}_3$. MW, 158. B.p. $181.5^\circ/734$ mm., $73-5^\circ/18$ mm. D_4^{20} 0.9540.

Chloride: $\text{C}_4\text{H}_7\text{OCl}$. MW, 106.5. B.p. 92° . D_4^{20} 1.0174. n_D^{20} 1.4079.

Amide: $\text{C}_4\text{H}_9\text{ON}$. MW, 87. M.p. 128° .

Nitrile: isobutyronitrile, isopropyl cyanide. $\text{C}_4\text{H}_7\text{N}$. MW, 69. B.p. $103.5^\circ (107-8^\circ)$.

Anilide: $\text{C}_{10}\text{H}_{13}\text{ON}$. MW, 163. M.p. 104.5° .

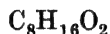
Fournier, *Bull. soc. chim.*, 1909, **5**, 921; 1910, **7**, 839.

Sabatier, Mailhe, *Compt. rend.*, 1911, **152**, 1046.

Hara, Komatsu, *Mem. Coll. Sci., Kyoto Imp. Univ.*, 1925, **8A**, 241 (*Chem. Abstracts*, 1925, **19**, 3248).

Récsei, *Chem.-Ztg.*, 1928, **52**, 22 (*Chem. Abstracts*, 1928, **22**, 1572).

Isobutyroin (3-Hydroxy-4-keto-2:5-dimethylhexane, 2:5-dimethyl-3-hexanolone-4, isopropyl-isobutyrylcarbinol)



MW, 144

Oil with camphor-like odour. B.p. $152-4^\circ$, $83^\circ/26$ mm., $55-7^\circ/3$ mm. $D_4^{26.5}$ 0.8990. $n_D^{26.5}$ 1.4159.

Oxime: cryst. from EtOH-pet. ether. M.p. $110-11^\circ$. B.p. $137^\circ/14$ mm.

Bouveault, Locquin, *Bull. soc. chim.*, 1906, **35**, 631, 642, 653.

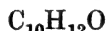
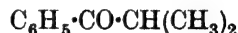
Gauthier, *Compt. rend.*, 1911, **152**, 1102.

Corson, Benson, Goodwin, *J. Am. Chem. Soc.*, 1930, **52**, 3988.

Isobutyronone

See Di-isopropyl Ketone.

Isobutyrophenone (Isopropyl phenyl ketone, isobutyrylbenzene)



MW, 148

B.p. $220^\circ/746$ mm., $125.5^\circ/32$ mm., $95-8^\circ (92^\circ)/10$ mm. D_4^{15} 0.9871. n_D^{15} 1.5196. Ox. \rightarrow benzoic + acetic acids. $\text{CH}_3\text{I} + \text{KOH}$ at $100^\circ \rightarrow$ *tert.*-butyl phenyl ketone.

Oxime: plates from ligroin. M.p. $94^\circ (61^\circ)$. B.p. $135-6^\circ/11$ mm.

Semicarbazone: needles from EtOH. M.p. $181^\circ (167^\circ)$.

Hydrazone: m.p. 71° .

Claus, *J. prakt. Chem.*, 1892, **46**, 480 (Footnote).

Nef, *Ann.*, 1900, **310**, 318.

Lapworth, Steele, *J. Chem. Soc.*, 1911, **99**, 1884.

Sabatier, Mailhe, *Compt. rend.*, 1914, **158**, 833.

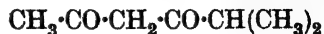
Favorski, Tchilingaren, *Compt. rend.*, 1926, **182**, 223.

Oumnoff, *Bull. soc. chim.*, 1928, **43**, 568.

Isobutyrylacetic Acid.

See 2-Ketoisocaproic Acid.

Isobutyrylacetone (Acetylisobutyrylmethane, 2-methylhexandione-3:5, 3:5-diketoisoeptane)



MW, 128

Oil. B.p. 168° (160–70°).
($C_7H_{11}O_2$)₂Cu : m.p. 171°.

Powell, Seymour, *J. Am. Chem. Soc.*,
1931, 53, 1049.

Isobutyrylbenzene.

See Isobutyrophenone.

Isobutyrylcresol.

See Hydroxy-methyl-isobutyrophenone.

Isobutyrylcyclohexane.

See Hexahydroisobutyrophenone.

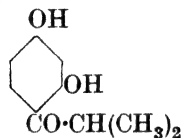
Isobutyrylformic Acid.

See 1-Ketoisovaleric Acid.

Isobutyrylnaphthalene.

See Isopropyl naphthyl Ketone.

4-Isobutyrylresorcinol (*Isopropyl 2 : 4-dihydroxyphenyl ketone*, *2 : 4-dihydroxyisobutyrophenone*)



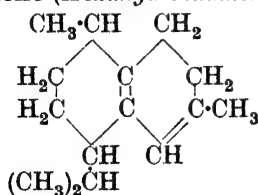
$C_{10}H_{12}O_3$ MW, 180
M.p. 67–68.5°. B.p. 173–5°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*,
1926, 48, 1692.

Isobutyryltoluene.

See Isopropyl tolyl Ketone.

Isocadinene (*Hexahydrocadalene*)

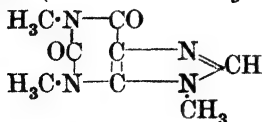


Probable structure

$C_{15}H_{24}$ MW, 204
B.p. 124–6°/11–12 mm. D_4^{20} 0.9154. n_D^{20} 1.5158.

Henderson, Robertson, *J. Chem. Soc.*,
1926, 2811.

Isocaffeine (1 : 3 : 9-Trimethylisoxanthine)

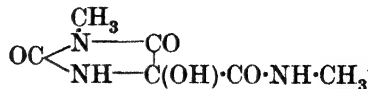


$C_8H_{10}O_2N_4$ MW, 194
M.p. 285–7°. Sol. H_2O . Spar. sol. EtOH.
Sublimes.

Gulland, Hobday, *Chem. Abstracts*, 1934,
28, 1926.

Biltz, Strufe, *Ann.*, 1921, 423, 223.

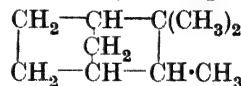
Isocaffuric Acid (1-Methyl-4-hydroxyhydantoyl-methylamide)



$C_6H_9O_4N_3$ MW, 187
M.p. 194°.

Gatewood, *J. Am. Chem. Soc.*, 1925, 47,
2188.

Isocamphane (*Dihydrocamphene*)



$C_{10}H_{18}$ MW, 138

Exists in several modifications.

(I) Liquid.

$[\alpha]_D^{20} + 1^\circ 15'$ in MeOH.Aq. D_4^{20} 0.8524. n_D^{20} 1.45733.

(II) Solid.

d.

Cryst. from MeOH. M.p. 62–3°. B.p. 166–
166.5°/750 mm. $[\alpha]_D^{20} + 8.68^\circ$ in C_6H_6 .

l.

Cryst. from EtOH. M.p. about 64°. B.p.
164–5°/757 mm. $[\alpha]_D - 8.50^\circ$ in EtOH.

dl.

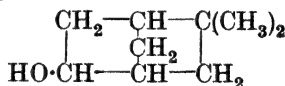
Cryst. from MeOH. M.p. 65–7°. B.p. 164°/
713 mm. Sol. EtOH, C_6H_6 , Me_2CO , AcOEt.
Mod. sol. MeOH. D_4^{20} 0.82757. n_D^{20} 1.44186.

Lipp, *Ann.*, 1911, 382, 280.

Komatsu, *Chem. Abstracts*, 1923, 17, 1455.

Nakai, *ibid.*, 1456.

Isocamphenilol



$C_9H_{16}O$ MW, 140

M.p. 78°. B.p. 196°/740 mm.

Acetyl : b.p. 195°/750 mm. D_4^{20} 0.9988. n_D^{20} 1.4624.

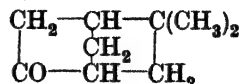
Benzoyl : m.p. 79°.

Acid phthalate : m.p. 118–19°.

Phenylurethane : m.p. 65°.

Hintikka, Komppa, *Ann.*, 1912, 387, 309.

Isocamphenilone (2 : 2-Dimethylbicyclo-[1, 2, 2]-heptanone-5)



$C_9H_{14}O$ MW, 138

(α). Fenchocamphorone.

M.p. 63–5°. B.p. 196.1–196.5°.

Semicarbazone : m.p. 192–3°.

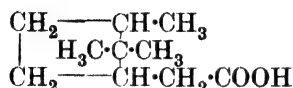
(β). M.p. 55–7°. Sublimes.

Semicarbazone : m.p. 225–6°.

Nametkin, *Chem. Abstracts*, 1925, **19**, 2946.

Nametkin, Khukhrikova, *Ann.*, 1924, **438**, 197.

Isocampholic Acid (2 : 2 : 3-Trimethylcyclopentylacetic acid)



$\text{C}_{10}\text{H}_{18}\text{O}_2$ MW, 170

dl.

Oil. B.p. 140–2°/11 mm. (141°/9 mm.). D_4^{20} 0.9789.

Et ester : $\text{C}_{12}\text{H}_{22}\text{O}_2$. MW, 198. B.p. 103°/12 mm. D_4^{20} 0.9426.

Chloride : $\text{C}_{10}\text{H}_{17}\text{OCl}$. MW, 188.5. B.p. 103°/11 mm.

Amide : $\text{C}_{10}\text{H}_{19}\text{ON}$. MW, 169. M.p. 109–10° (112°). B.p. 192–3°/14 mm. *N-Et* : b.p. 175–6°/12 mm.

Anilide : m.p. 137–9° (119.5°). B.p. 188°/10 mm.

p-Toluidide : m.p. 133–4°.

Lipp, Reinmartz, *Helv. Chim. Acta*, 1927, **10**, 611.

Lipp, *Ber.*, 1922, **55**, 1883.

Braun, Heymons, *Ber.*, 1928, **61**, 2276.

Isocamphoramidic Acid.

See under Isocamphoric Acid.

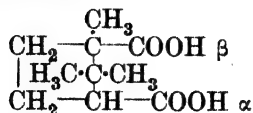
α -Isocamphorene

$\text{C}_{20}\text{H}_{32}$ MW, 272

B.p. 193–7°/19 mm. D_4^{21} 0.9029.

Semmler, Jonas, *Ber.*, 1914, **47**, 2077.

Isocamphoric Acid



$\text{C}_{10}\text{H}_{16}\text{O}_4$ MW, 200

d.

M.p. 171–2°. Sol. EtOH, AcOH. Spar. sol. H_2O . $k = 1.74 \times 10^{-5}$ at 25°. $[\alpha]_D - 47.6^\circ$ in EtOH.Aq.

l.

M.p. 173° (171.5–172.5°). Sol. EtOH. $k = 1.6 (1.74) \times 10^{-5}$ at 25°.

α -Me ester : $\text{C}_{11}\text{H}_{18}\text{O}_4$. MW, 214. M.p. 89.5–90°. $[\alpha]_D - 58.4^\circ$ in EtOH.Aq. *Amide* : m.p. 157°.

β -Me ester : oil. $[\alpha]_D - 53.1^\circ$ in EtOH.Aq. *Amide* : m.p. 127–8°.

Di-Me ester : $\text{C}_{12}\text{H}_{20}\text{O}_4$. MW, 228. B.p. 146°/22 mm., 130°/8 mm. D_4^{20} 1.073. $[\alpha]_D^{22} - 66.5^\circ$ in EtOH.

α -Et ester : $\text{C}_{12}\text{H}_{20}\text{O}_4$. MW, 228. M.p. 75° (73.5°). B.p. 195–7°/18–20 mm. $[\alpha]_D - 46.28^\circ$ in EtOH.Aq. $k = 6.5 \times 10^{-6}$ at 25°.

β -Et ester : b.p. 176°/12 mm. D_4^{16} 1.092. $[\alpha]_D - 22.9^\circ$ in EtOH.Aq.

Di-Et ester : $\text{C}_{14}\text{H}_{24}\text{O}_4$. MW, 256. B.p. 165°/25–28 mm. D_4^{21} 1.0282. $n_D^{21.6}$ 1.4545. $[\alpha]_D^{16} - 50.4^\circ$ in EtOH.Aq.

Dichloride : $\text{C}_{10}\text{H}_{14}\text{O}_2\text{Cl}_2$. MW, 237. B.p. 153–4°/24 mm. $D_4^{20.6}$ 1.2270. $n_D^{20.7}$ 1.499.

β -Amide : isocamphoramidic acid. $\text{C}_{10}\text{H}_{17}\text{O}_3\text{N}$. MW, 199. M.p. 165–6°.

Diamide : $\text{C}_{10}\text{H}_{16}\text{O}_2\text{N}_2$. MW, 196. M.p. 132° (160° anhyd.).

dl.

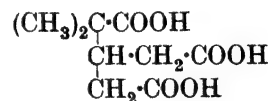
Prisms from H_2O . M.p. 191°. Spar. sol. EtOH. Insol. pet. ether. $k = 1.74 \times 10^{-5}$ at 25°.

Bredt, *Ann.*, 1913, **395**, 57.

Noyes, Nickell, *J. Am. Chem. Soc.*, 1914, **36**, 118.

Skinner, *J. Am. Chem. Soc.*, 1917, **39**, 2698.

Isocamphoronic Acid (2 : 3-Dimethylbutane-1 : 3 : 3'-tricarboxylic acid)



$\text{C}_9\text{H}_{14}\text{O}_6$ MW, 218

Prisms from H_2O . M.p. 166–7° (164–5°). Sol. H_2O , EtOH, Et_2O , AcOEt. Insol. pet. ether, CHCl_3 . Sublimes.

Tri-Et ester : $\text{C}_{15}\text{H}_{26}\text{O}_6$. MW, 302. B.p. 195–200°/36 mm.

Lactone : (a) *cis*, m.p. 186°. (b) *Trans* : m.p. 256°.

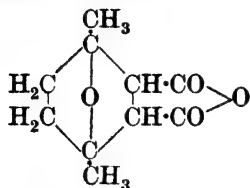
Lipp, *Ber.*, 1914, **47**, 2996.

Aschan, *Ann.*, 1913, **398**, 311.

Tiemann, *Ber.*, 1896, **29**, 3020.

Isocantharidin (Note : the “isocantharidin”)

of Gadamer, *Chem. Abstracts*, 1918, 12, 806, was shown to possess a different constitution)



$C_{10}H_{18}O_4$

MW, 196

Cryst. from ligroin. M.p. 121–5°.

Diels, Adler, *Ber.*, 1929, 62, 561.

Isocaproic Acid.

See 7-Methylpelargonic Acid.

Isocaproic Acid (*Isobutylacetic acid, isopentane-4-carboxylic acid, 3-methylvaleric acid*)



$C_6H_{12}O_2$

MW, 116

Oil. M.p. – 33°. B.p. 199.1°/752 mm. (197°/750 mm.), 94°/15 mm. (101–2°/13 mm.), 91–2°/9 mm. D_4^{20} 0.9225. n_D^{20} 1.4144. Heat of comb. 837.8 Cal. $k = 1.53 (1.57) \times 10^{-5}$ at 25°.

Et ester: $C_8H_{16}O_2$. MW, 144. B.p. 160–4°/737 mm. D_4^{20} 0.8705.

Isoamyl ester: $C_{11}H_{22}O_2$. MW, 186. B.p. 215–20°.

Chloride: $C_6H_{11}OCl$. MW, 134.5. B.p. 143.8–144.6°/745 mm. D_4^{20} 0.9725.

Amide: $C_6H_{13}ON$. MW, 115. M.p. 120–1° (118.8°).

Anhydride: $C_{12}H_{22}O_3$. MW, 214. B.p. 139°/19 mm., 130–1°/15 mm.

Nitrile: isoamyl cyanide. $C_6H_{11}N$. MW, 97. B.p. 156–7°/761 mm. D_4^{15} 0.8069. n_D^{15} 1.40851.

Anilide: m.p. 112° (110–110.5°).

p-Toluidide: m.p. 63° (61.5–62.5°).

1-Naphthalide: m.p. 110–11°.

Ziegler, F.P., 728,241, (*Chem. Abstracts*, 1932, 26, 5573).

Hommelen, *Bull. soc. chim. Belg.*, 1933, 42, 243.

Curtius, *J. prakt. Chem.*, 1930, 125, 152.

Michael, *Ber.*, 1901, 34, 925.

Grignard, *Ann. chim.*, 1901, 24, 455.

Noyes, *J. Am. Chem. Soc.*, 1901, 23, 393.

Underwood, Gale, *J. Am. Chem. Soc.*, 1934, 56, 2117.

Isocaproic Aldehyde (*Isobutylacetaldehyde, isoamylformaldehyde, 3-methylvaleraldehyde*)



$C_6H_{12}O$

MW, 100

B.p. 121°/743 mm.

Oxime: b.p. 103°/35 mm., 90–1°/20 mm. D_4^{20} 0.910.

Di-Et acetal: 4:4-diethoxyisopentane. B.p. 180–2°.

Sabatier, Mailhe, *Compt. rend.*, 1912, 154, 563.

Bouveault, *Compt. rend.*, 1903, 137, 989.

Isocaprone (*Di-isoamyl ketone, 2:8-dimethylnonanone-5, 5-keto-2:8-dimethylnonane*)



$C_{11}H_{22}O$

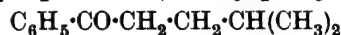
MW, 170

Yellow oil. B.p. 226° (224°).

Wache, *J. prakt. Chem.*, 1889, 39, 250.

Sabatier, Mailhe, *Compt. rend.*, 1914, 158, 832.

Isocaprophenone (*Isoamyl phenyl ketone*)



$C_{12}H_{16}O$

MW, 176

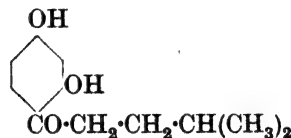
M.p. – 2°. B.p. 255–6°, 240°/720 mm., 143–8°/20 mm. D_4^{20} 0.971. n_D^{20} 1.533.

Oxime: m.p. 71–2°.

Semicarbazone: m.p. 150–1° (145–6°).

Shriner, Turner, *J. Am. Chem. Soc.*, 1930, 52, 1267.

4-Isocaproylresorcinol (*Isoamyl 2:4-dihydroxyphenyl ketone, 2:4-dihydroxyisocaprophenone*)



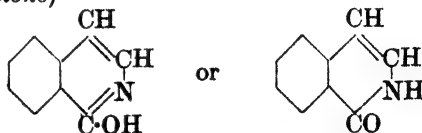
$C_{12}H_{16}O_3$

MW, 208

M.p. 76–77.5°. B.p. 192–4°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, 48, 1692.

Isocarbostryl (*1-Hydroxyisoquinoline, isoquinolone*)



C_9H_7ON

MW, 145

Needles from H_2O . M.p. 209–10°. Sublimes.

Me ether: $C_{10}H_9ON$. MW, 159. B.p. 240°, 182–6°/34 mm.

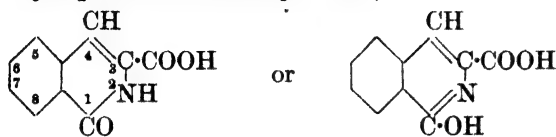
Et ether: $C_{11}H_{11ON}$. MW, 173. B.p. 182–3°/27 mm.

N-Me: $C_{10}H_9ON$. MW, 159. M.p. 40° . B.p. $314-15^\circ/720$ mm.

Bain, Perkin, Robinson, *J. Chem. Soc.*, 1914, 105, 2397.

Tschitschibabin, Kursanova, *Chem. Abstracts*, 1931, 25, 2727.

Isocarbostryril-3-carboxylic Acid (1-Hydroxyisoquinoline-3-carboxylic acid)



$C_{10}H_7O_3N$

MW, 189

Needles from Me_2CO . M.p. 320° . Spar. sol. EtOH, Et_2O , $CHCl_3$, AcOH, Me_2CO , C_6H_6 , H_2O . Sublimes. Heat \rightarrow isocarbostryril. Zn \rightarrow isoquinoline. $FeCl_3 \rightarrow$ yellowish-red col.

N-Me: $C_{11}H_9O_3N$. MW, 203. Prisms. M.p. 238° .

N-Et: $C_{12}H_{11}O_3N$. MW, 217. Prisms. M.p. 202° .

N-Phenyl: $C_{18}H_{11}O_3N$. MW, 265. Prisms from dil. EtOH. M.p. 265° .

Picrate: m.p. $129-30^\circ$.

Bain, Perkin, Robinson, *J. Chem. Soc.*, 1914, 105, 2397.

Bamberger, Frew, *Ber.*, 1894, 27, 203.

Isocarbostryril-4-carboxylic Acid (1-Hydroxyisoquinoline-4-carboxylic acid).

Needles from AcOH. M.p. 290° decomp.

Et ester: $C_{12}H_{11}O_3N$. MW, 217. Needles from EtOH. M.p. 227° .

N-Me: needles from AcOH. M.p. 262° .

Dieckmann, Meiser, *Ber.*, 1908, 41, 3266.

Isocarotene

$C_{40}H_{56}$

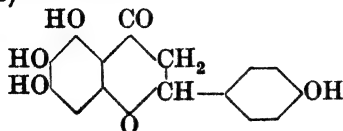
MW, 536

Needles or leaflets with steel-blue reflex. M.p. $192-3^\circ$.

Karrer, Schöpp, Morf, *Helv. Chim. Acta*, 1932, 15, 1162.

See also Karrer, Walker, *Helv. Chim. Acta*, 1934, 17, 43.

Isocarthamidin (5:6:7:4'-Tetrahydroxyflavanone)



$C_{15}H_{12}O_6$

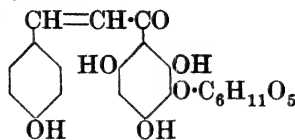
MW, 288

Yellow cryst. containing H_2O . M.p. 240° .

Tetra-acetyl: m.p. 179° .

Kuroda, *J. Chem. Soc.*, 1930, 752, 765.

Isocarthamin (Glucoside of 4:2':3':4':6'-pentahydroxychalkone)



$C_{21}H_{22}O_{11}$

MW, 450

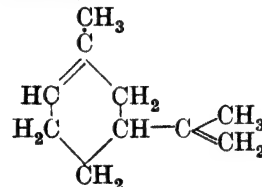
Yellow needles + $2H_2O$. M.p. 228° . Unstable, changing in air to red amorphous powder. Formed from the isomeric carthamin (q.v.) with cold, dilute HCl.

See previous reference.

Isocarveol.

See Pinocarveol.

Isocarvestrene (Δ^6 ,⁸⁽⁹⁾-m-Menthadiene, 1-methyl-5-isopropenylcyclohexene)



$C_{10}H_{16}$

MW, 136

B.p. $176-7^\circ/765$ mm. D_{20}^{20} 0.8496.

Fisher, Perkin, *J. Chem. Soc.*, 1908, 93, 1890.

Isocarvone.

See Pinocarvone.

Isocaryophyllene (γ -Caryophyllene)

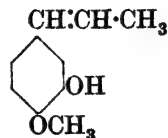
$C_{15}H_{24}$

MW, 204

B.p. $125-125.5^\circ/14.5$ mm. D_{20}^{20} 0.89941. n_D^{20} 1.49665. $[\alpha]_D^{20}$ 26.174° .

Deussen, Meyer, *J. prakt. Chem.*, 1914, 90, 324.

Isochavibetol (2-Methoxy-5-propenylphenol, 4-propenylguaiacol, 3-hydroxy-4-methoxy-1-propenylbenzene)



$C_{10}H_{12}O_2$

MW, 164

M.p. 96° (92°). B.p. $147^\circ/19$ mm.

Acetyl: m.p. 101° .

Me ether: dimethoxypropenylbenzene. See under Isoeugenol.

Et ether: $C_{12}H_{16}O_2$. MW, 192. M.p. 49–50°.

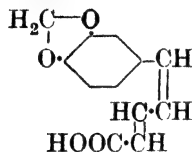
Stockelbuch, U.S.P., 1,792,717, (*Chem. Abstracts*, 1931, **25**, 2154).

Hirao, *Chem. Abstracts*, 1933, **27**, 277, 5731.

Imoto, *Chem. Abstracts*, 1934, **28**, 3393, 4719.

Helfer, Mottier, *Chem. Zentr.*, 1935, **I**, 1862.

Isochavivic Acid (*Isochaviacinic acid*)



$C_{12}H_{10}O_4$ MW, 218

Stereoisomer of piperic acid occurring in black pepper. M.p. 202°.

Ott, Eichler, *Ber.*, 1922, **55**, 2661.

Lohaus, *J. prakt. Chem.*, 1928, **119**, 271.

Iso-2-chloro-1-hydroxybutyric Acid.

See 2-Chloro-1-hydroxybutyric Acid.

Isocholanic Acid.

See Hyocholanic Acid.

Isochollepidanic Acid

$C_{24}H_{24}O_{12}$ ($C_{24}H_{32}O_{12}$) MW, 514 (512)

Cryst. from hot H_2O . M.p. 302°. $[\alpha]_D^{25} + 21.3^\circ$ in EtOH.

Hexa-Me ester: $C_{30}H_{48}O_{12}$ ($C_{30}H_{46}O_{12}$). MW, 600 (598). M.p. 128°.

Wieland, Kraft, *Z. physiol. Chem.*, 1932, **211**, 209.

β -Isocholoidanic Acid

$C_{24}H_{36}O_{10}$ MW, 484

Needles from AcOH.Aq. M.p. 273° decomp.

Wieland, Honold, Pascual-Vila, *Z. physiol. Chem.*, 1923, **130**, 333.

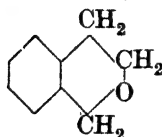
Isochondodendrin (*Isobebeerin*)

$C_{36}H_{36}O_6N_2$ MW, 594

Alkaloid from root of *Chondodendron platyphyllum*, Myers., (pareira root). M.p. 290°. $[\alpha]_D^{17} + 50^\circ$ in Py.

Faltis, Dieterich, *Ber.*, 1934, **67**, 231.

Isochroman (3 : 4-Dihydrobenz- β -pyran)



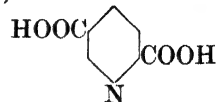
$C_9H_{10}O$

MW, 134

B.p. 90°/12 mm.

v. Braun, Zobel, *Ber.*, 1923, **56**, 2149.

Isocinchomeronic Acid (*Pyridine-2 : 5-dicarboxylic acid*)



$C_7H_5O_4N$ MW, 167

M.p. 254° decomp.

Me ester: *hydrazide*, m.p. 173° decomp.

Di-Me ester: $C_9H_9O_4N$. MW, 195. M.p. 164°.

Di-phenyl ester: $C_{19}H_{13}O_4N$. MW, 319. M.p. 156°.

Diamide: $C_7H_7O_2N_3$. MW, 165. M.p. 310° decomp.

Dihydrazide: m.p. 268–9°.

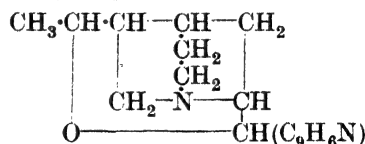
Meyer, Staffen, *Monatsh.*, 1913, **34**, 517.

Meyer, *Rec. trav. chim.*, 1925, **44**, 327.

Isocinchonicine.

See Isocinchotoxine.

Isocinchonine



$C_{19}H_{22}ON_2$ MW, 294

α .

Cryst. from AcOEt. M.p. 126–7°. $[\alpha]_D^{25} + 52.86^\circ$ in EtOH.

β -Cinchonine.

Cryst. from ligroin. M.p. 128–30°. $[\alpha]_D^{20} - 59^\circ$ in EtOH.

B,HCl: m.p. 212°.

N-oxide: $C_{19}H_{22}O_2N_2$. MW, 310. M.p. 192–3°. $[\alpha]_D^{20} - 82^\circ$ in EtOH.

Rabe, Böttcher, *Ber.*, 1917, **50**, 130.

Isocinchotoxine (*Isocinchonicine*)

$C_{19}H_{22}ON_2$ MW, 294

α .

Cryst. from EtOH.Aq. M.p. 98–100°.

β .

N-Acetyl deriv.: m.p. 121°.

N-Nitroso deriv.: m.p. 101–3°.

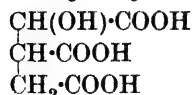
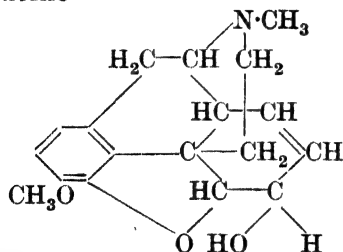
N-Me deriv.: m.p. 86°. *Hydriodide*: m.p. 282° decomp.

N-Et deriv.: m.p. 85–6°. *Hydriodide*: m.p. 232°.

Konopnicki, Ludwiczakowna, Suszko, *Chem. Zentr.*, 1934, **I**, 705.

Isocinnamic Acid.

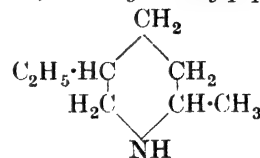
See under Cinnamic Acid.

Isocitric Acid (1-Hydroxypropane-1 : 2 : 3-tricarboxylic acid, 1-hydroxytricarballic acid) $\text{C}_6\text{H}_8\text{O}_7$ MW, 192Occurs in *Rubus candicans*, Weihe., (black-berry). M.p. about 105°.Tri-Et ester: $\text{C}_{12}\text{H}_{20}\text{O}_7$. MW, 276. B.p. 180–1°/10 mm.Lactone: $\text{C}_6\text{H}_6\text{O}_6$. MW, 174. M.p. 120–30°.Nelson, *J. Am. Chem. Soc.*, 1930, **52**, 2928 (Bibl.).**Isoclovene** $\text{C}_{15}\text{H}_{24}$ MW, 204Viscous liquid. B.p. 130–1°/12 mm. D_4^{19} 0.943. n_D^{19} 1.5039. $[\alpha]_D^{14}$ –56.6°. Resinifies in air.Henderson, McCrone, Robertson, *J. Chem. Soc.*, 1929, 1369.**Isoclovene Alcohol** $\text{C}_{15}\text{H}_{26}\text{O}$ MW, 222Cryst. from AcOEt. M.p. 98°. $[\alpha]_D^{25}$ +227°.Henderson, McCrone, Robertson, *J. Chem. Soc.*, 1929, 1372.**Isococaine.**See ψ -Cocaine.**Isocodeine** $\text{C}_{18}\text{H}_{21}\text{O}_3\text{N}$ MW, 299

M.p. 171–2°.

Acid tartrate: m.p. 185–6°. $[\alpha]_D^{29}$ –98° in H_2O .Eddy, Small, *Chem. Abstracts*, 1934, **28**, 5073.**Isoconessimine** $\text{C}_{23}\text{H}_{38}\text{N}_2$ MW, 342Alkaloid from seeds and bark of Indian *Holarrhena*. Needles from pet. ether. M.p. 92°. $[\alpha]_D$ +30° in EtOH.Aq. Sol. ord. org. solvents.Di-hydrate: $\text{C}_{23}\text{H}_{38}\text{N}_2 \cdot 2\text{H}_2\text{O}$. MW, 378. M.p. 88–92°. $B, 2\text{HCl}$: m.p. 335°. $B, 2\text{HBr}$: m.p. 344°. $B, 2\text{HI}$: m.p. 316°. $B, \text{H}_2\text{PtCl}_6$: m.p. 285° decomp.

Picrate: m.p. 198–200° decomp.

Siddiqui, *J. Indian Chem. Soc.*, 1934, **11**, 283.**Isocopellidine** (Copellidine-B, 2-methyl-5-ethylpiperidine, 6-methyl-3-ethylpiperidine) $\text{C}_8\text{H}_{17}\text{N}$ MW, 127

d-.

B.p. 163–6°/770 mm.

l-.

B.p. 162–162.5°/776 mm.

 B, HCl : m.p. 113–15°.

Acid tartrate: m.p. 61–2°.

 B, HAuCl_4 : m.p. 115°.

N-Benzenesulphonyl: m.p. 64°.

dl-.

B.p. 162–4°/763 mm.

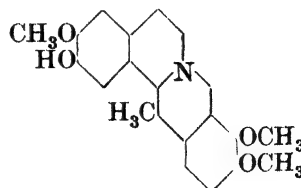
N-Benzenesulphonyl: m.p. 66°.

Levy, Wolfenstein, *Ber.*, 1896, **29**, 1960.**Isocordine** $\text{C}_{20}\text{H}_{23}\text{O}_4\text{N}$ MW, 341Alkaloid occurring in Korean *Corydalis* bulbs. M.p. 185°.Benzoyl deriv.: l-acid tartrate: m.p. 217–18°. $[\alpha]_D^{17}$ +69.5°.Go, *Chem. Abstracts*, 1930, **24**, 620.**Isocoriamyrtin** $\text{C}_{15}\text{H}_{18}\text{O}_5$ MW, 278

M.p. 224°.

Oxime: m.p. 265°.

Phenylhydrazone: m.p. 118–22°.

Kariyone, Sato, *Chem. Abstracts*, 1932, **26**, 1937.**Isocorybulbine** $\text{C}_{21}\text{H}_{25}\text{O}_4\text{N}$ MW, 355

Alkaloid of *Corydalis tuberosa*, D.C. Leaflets from EtOH. M.p. 187.5–188.5°. Spar. sol. EtOH. $[\alpha]_D^{25} + 301^\circ$ in CHCl_3 .

Methiodide : m.p. 218–21°.

Bruchhausen, Stippler, *Chem. Abstracts*, 1927, 21, 1963.

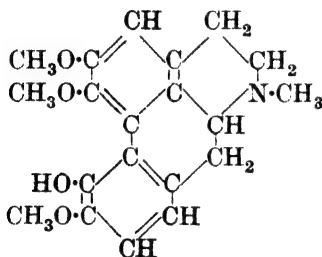
Sawai, *Chem. Abstracts*, 1929, 23, 3230.

Späth, Holter, *Ber.*, 1926, 59, 2800.

Isocorydaline.

dl-Corydaline, *q.v.*

Isocorydine (*Corytuberine methyl ether*)



$\text{C}_{20}\text{H}_{23}\text{O}_4\text{N}$

MW, 341

Alkaloid occurring in *Dicentra canadensis*, and *Corydalis* species. Plates. M.p. 185°. Spar. sol. Et_2O . $[\alpha]_D^{20} + 195.3^\circ$ in CHCl_3 .

Methiodide : m.p. 213–14° decomp.

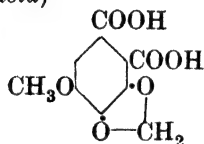
Gadamer, *Chem. Zentr.*, 1912, I, 149.

Späth, Berger, *Ber.*, 1931, 64, 2038.

Gulland, Ross, Smellie, *J. Chem. Soc.*, 1931, 2885 (*Bibl.*).

Go, *Chem. Abstracts*, 1930, 24, 620.

Isocotarnic Acid (5-Methoxy-3 : 4-methylene-dioxy-phthalic acid)



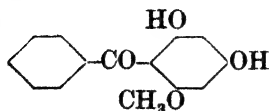
$\text{C}_{10}\text{H}_8\text{O}_7$

MW, 240

Anhydride : $\text{C}_{10}\text{H}_6\text{O}_6$. MW, 222. M.p. 196–7°.

Späth, Schmid, Sternberg, *Ber.*, 1934, 67, 2095.

Isocotoin (2 : 4-Dihydroxy-6-methoxybenzophenone)



$\text{C}_{14}\text{H}_{12}\text{O}_4$

MW, 244

Yellow needles from ligroin. M.p. 162°. Sol. H_2O . Mod. sol. ligroin. $\text{FeCl}_3 \rightarrow$ reddish-brown col.

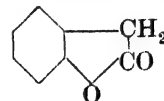
2-p-Toluenesulphonyl : m.p. 146°.

4-p-Toluenesulphonyl : m.p. 109°.

2 : 4-Di-p-toluenesulphonyl : m.p. 137°.

Karrer, Leichenstein, *Helv. Chim. Acta*, 1928, 11, 789.

Isocoumaranone (Lactone of *o*-hydroxy-phenylacetic acid, 2-ketocoumaran)



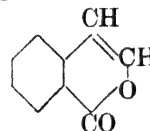
$\text{C}_8\text{H}_6\text{O}_2$

MW, 134

(i) Labile. M.p. 28° (28.5°). (ii) Stable. M.p. 49°. B.p. 245–9°. $D_4^{25} 1.2236$. $n_D^{25} 1.555$.

Auwers, *Ber.*, 1919, 52, 129.

Isocoumarin



$\text{C}_9\text{H}_6\text{O}_2$

MW, 146

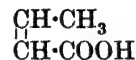
Plates from C_6H_6 . M.p. 47° (46°). B.p. 285–6°/719 mm. Sol. EtOH, Et_2O , C_6H_6 , CS_2 . Volatile in steam.

Gabriel, *Ber.*, 1903, 36, 573.

Isocreosol.

See under Homocatechol.

Isocrotonic Acid (2-Methylacrylic acid, ethylideneacetic acid, β -crotonic acid, 1-propylene-1-carboxylic acid, allocrotonic acid, *cis*-crotonic acid)



$\text{C}_4\text{H}_6\text{O}_2$

MW, 86

Needles or prisms from pet. ether. M.p. 15.5° (14.4–14.6°). B.p. 169°, 78.5°/20 mm., 74°/15 mm. Sol. H_2O . $D_4^{25} 1.0312$. $n_D^{25} 1.4483$. Sol. in H_2O or CS_2 in sunlight, or heat to 180° \rightarrow crotonic acid. HI \rightarrow 2-iodobutyric acid. Cl \rightarrow 1 : 2-dichlorobutyric acid. Br \rightarrow 1 : 2-dibromobutyric acid. KOH fusion \rightarrow acetic acid.

Me ester : $\text{C}_5\text{H}_8\text{O}_3$. MW, 100. B.p. 119°.

Et ester : $\text{C}_6\text{H}_{10}\text{O}_4$. MW, 114. B.p. 136°, 125.5–126°/749 mm. (129–133°/742 mm.). $D_4^{25} 0.9182$. $n_D^{25} 1.42423$.

Amide : $\text{C}_4\text{H}_7\text{ON}$. MW, 85. M.p. 102°.

Nitrile: C_4H_5N . MW, 67. B.p. $107.4^\circ/757$ mm. D_4^{15} 0.8289. n_D^{15} 1.42065.

Heim, *Chem. Abstracts*, 1934, **28**, 2328.

Auwers, *Ann.*, 1923, **432**, 46.

Bruylants, *Chem. Abstracts*, 1929, **23**, 4443.

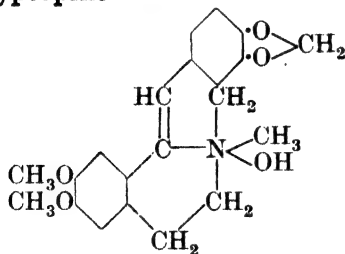
Kaufler, *Monatsh.*, 1929, **53**, **54**, 119.

Heine, *Chem. Abstracts*, 1931, **25**, 5663.

Isocrotonyl bromide.

See 1-Bromoisobutylene.

Isocryptopine



$C_{21}H_{23}O_5N$

MW, 369

Only occurs in form of salts.

Chloride: decomp. at 223° .

Iodide: m.p. about $245-7^\circ$ decomp.

Monosulphate: m.p. $215-20^\circ$ decomp.

Disulphate: decomp. at 250° .

Perkin, *J. Chem. Soc.*, 1916, **109**, 883.

Iso- ψ -cumenol.

See 6-Hydroxy- ψ -cumene.

Isocusparine

$C_{19}H_{17}O_4N$

MW, 323

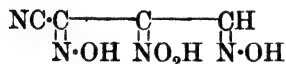
M.p. 194° .

Troeger, Mueller, *Chem. Abstracts*, 1915, **9**, 2079.

Isocyanic Acid.

See Cyanic Acid.

Isocyanilic Acid (β -Methazonic anhydride)



$C_4H_4O_4N_4$

MW, 172

Prisms. M.p. $170-2^\circ$ (sealed tube). Sol. hot H_2O . Explosive.

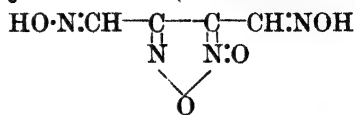
Diacetyl deriv.: needles from EtOH. M.p. 134° .

Dibenzoyl deriv.: needles from EtOH. M.p. 181° decomp.

Wieland, Frank, Kitasato, *Ann.*, 1929, **475**, 45.

Wieland, *Ann.*, 1925, **444**, 19.

β -Isocyanilic Acid (α -Methazonic anhydride)



$C_4H_4O_4N_4$

MW, 172

Leaflets. M.p. 119° . Spar. sol. H_2O .

Dibenzoyl deriv.: m.p. 155° .

Wieland, Frank, Kitasato, *Ann.*, 1929, **475**, 51.

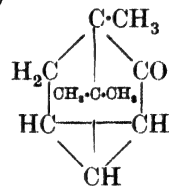
Isocyanuric Acid.

See Cyanuric Acid.

Isocyclene.

See Isobornylene.

Isocyclenone (Note: this compound has previously been wrongly named "camphenone" in the literature)



$C_{10}H_{14}O$

MW, 150

Cryst. from pet. ether. M.p. $166-8^\circ$ ($168-70^\circ$). B.p. $205-7^\circ$. Sol. ord. org. solvents.

Oxime: m.p. 132° .

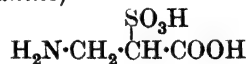
Hydrazone: m.p. about 45° .

Semicarbazone: m.p. $243-4^\circ$.

Bredt, Holz, *J. prakt. Chem.*, 1917, **95**, 149.

Nametkin, *Ber.*, 1926, **59**, 368 (*Bibl.*).

Isocysteic Acid (2-Aminopropionic acid-1-sulphonic acid, 2-amino-1-sulphopropionic acid, 1-sulpho- β -alanine)



$C_3H_7O_5NS$

MW, 169

d.

Decomp. at 266° . $[\alpha]_D - 8.66^\circ$.

dl.

Cryst. from hot H_2O . Decomp. at $272-4^\circ$. Spar. sol. H_2O .

Gabriel, *Ber.*, 1905, **38**, 642.

Isocysteine (1-Mercapto-2-aminopropionic acid)

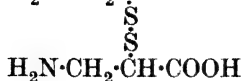
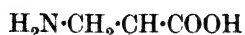


$C_3H_7O_2NS$

MW, 121

B.HCl: cryst. from hot EtOH. M.p. 141° .

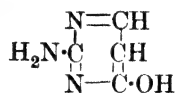
Gabriel, *Ber.*, 1905, **38**, 637.

IsocystineC₆H₁₂O₄N₂S₂

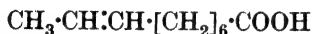
MW, 240

Cryst. M.p. 180–5° decomp.

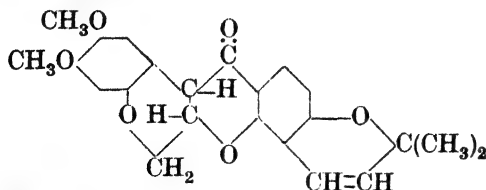
B, HI : m.p. 189° decomp.

Gabriel, *Ber.*, 1905, **38**, 640.**Isocytosine (4-Hydroxy-2-aminopyrimidine)**C₄H₅ON₃

MW, 111

Prisms from H₂O. M.p. 280° decomp.Me ether : C₅H₇ON₃. MW, 125. Prisms from H₂O. M.p. 125°.d-Glucoside : m.p. 166° decomp. $[\alpha]_D^{24} - 72.6^\circ$. Tetra-acetyl deriv. : m.p. 131–2°. $[\alpha]_D^{13} - 17.7^\circ$ in MeOH.Hilbert, Johnson, *J. Am. Chem. Soc.*, 1930, **52**, 1156.Hahn, Laves, Schäfer, *Zeitschrift für Biologie*, 1926, **84**, 411.**Isodecylenic Acid (2-Nonene-9-carboxylic acid)**C₁₀H₁₈O₂

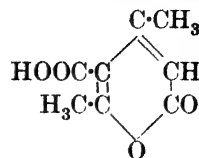
MW, 170

B.p. 155–7°/14 mm. D₁₅ 0.930.Me ester : C₁₁H₂₀O₂. MW, 184. B.p. 121–3°/20 mm. D₁₅ 0.896.Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, **10**, 187.**Isodeguelin**C₂₃H₂₂O₆

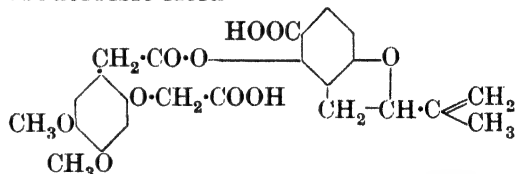
MW, 394

Occurs in seeds of *Tephrosia Vogelii*, Hook. Needles or plates. M.p. 168°.

Oxime : m.p. 233–4°.

Merz, Schmidt, *Chem. Zentr.*, 1935, **I**, 2027.**Isodehydracetic Acid (4:6-Dimethylcoumalic acid, carbacetoacetic acid)**C₈H₈O₄

MW, 168

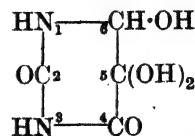
Needles or plates from H₂O, prisms from EtOH. M.p. 155°. Sol. EtOH, Et₂O, hot H₂O. Sublimes. $k = 5.2 \times 10^{-3}$ at 25°.Me ester : C₉H₁₀O₄. MW, 182. Needles from EtOH.Aq. or Et₂O. M.p. 67–67.5°. B.p. 188°/30 mm., 167°/14 mm.Et ester : C₁₀H₁₂O₄. MW, 196. M.p. 17–18°. (17.5–18.5°, 24–5°). B.p. 285° decomp. (290–5°), 191°/35 mm., 185°/25 mm., 177°/16 mm., 166°/12 mm. D₄²⁰ 1.1673.Buchner, Schröder, *Ber.*, 1902, **35**, 790.Nieme, Pechmann, *Ann.*, 1891, **261**, 202.Anschütz, Bendix, Kerp, *Ann.*, 1890, **259**, 155.**Isoderrisic Acid**C₂₃H₂₄O₈

MW, 428

Cryst. from EtOH.Aq. M.p. 156°.

Et ester : C₂₅H₂₈O₈. MW, 456. Cryst. from EtOH.Aq. M.p. 128°.Laforge, Haller, Smith, *J. Am. Chem. Soc.*, 1931, **53**, 4407.**Isoderritol**C₂₁H₂₂O₆

MW, 370

Yellow leaflets. M.p. 148°. FeCl₃ → bluish-green col.Takai, Miyajima, Ono, *Ber.*, 1932, **65**, 287.**Isodiallyl.**Dipropenyl, *q.v.***Isodialuric Acid (5:5:6-Trihydroxy-5:6-dihydrouracil)**C₄H₆O₅N₂ (+ H₂O)

MW, 162 (180)

Sol. H_2O , Me_2CO . Spar. sol. EtOH , Et_2O . Insol. ligroin.

Diacetyl deriv.: decomp. at 118° .

5-Me ether: $\text{C}_5\text{H}_8\text{O}_5\text{N}_2$. MW, 176. Decomp. at 215° .

Di-Me ether: $\text{C}_6\text{H}_{10}\text{O}_5\text{N}_2$. MW, 190. Decomp. at 215° .

5-Et ether: $\text{C}_6\text{H}_{10}\text{O}_5\text{N}_2$. MW, 190. Decomp. at 210° (160° anhyd.).

Di-Et ether: $\text{C}_8\text{H}_{14}\text{O}_5\text{N}_2$. MW, 218. Decomp. at 210° .

Biltz, Paetzold, *Ann.*, 1927, 452, 75.

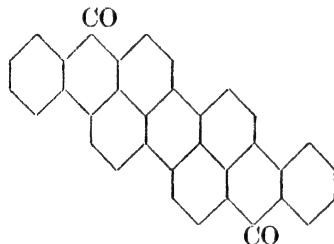
Isodianthranyl

$\text{C}_{28}\text{H}_{18}$ MW, 354

Pale yellow cryst. from AcOH . M.p. 312° .

Barnett, Goodway, *J. Chem. Soc.*, 1929, 814 (*Bibl.*).

Isodibenzanthrone (*Isoviolanthrone*)



$\text{C}_{34}\text{H}_{16}\text{O}_2$ MW, 456

Dark violet powder. Sol. $\text{PhNO}_2 \rightarrow$ reddish-violet sol. with brown fluor. Spar. sol. ord. org. solvents. $\text{H}_2\text{SO}_4 \rightarrow$ green col.

Sharvin, Soborovskii, *Chem. Abstracts*, 1929, 23, 4695.

Lüttringhaus, Neresheimer, *Ann.*, 1929, 473, 259.

Isodibromosuccinic Acid.

See under 1 : 2-Dibromosuccinic Acid.

Isodibutylene.

See Trimethylpentene.

Isodichlorosuccinic Acid.

See under 1 : 2-Dichlorosuccinic Acid.

Isodidesyl.

See under Didesyl.

Iso-dill-apiol.

See Dill-apiol.

Isodiphenic Acid.

See Diphenyl-2 : 3'-dicarboxylic Acid.

Isodiphenylbenzene.

See 1 : 3-Diphenylbenzene.

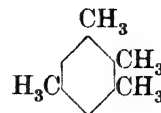
Isodiphenyloxyethylamine.

See under α -Hydroxy- β -aminodibenzyl.

Isodiprene.

See d - Δ^3 -Carene.

Isodurene (1 : 2 : 3 : 5-Tetramethylbenzene, isodurool)



$\text{C}_{10}\text{H}_{14}$ MW, 134

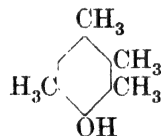
F.p. -24.1° . B.p. $195-7^\circ$, $84.6-84.7^\circ/17\text{ mm}$. D_4^{20} 0.8906. n_D^{20} 1.5134. Heat of comb. C_v 10,358 cal./gm. Sulphonated completely in 30 seconds by 2 vols. conc. $\text{H}_2\text{SO}_4 \rightarrow$ mono-sulphonic acid: cryst. + $2\text{H}_2\text{O}$. M.p. 79° . Hyd. by 20% HCl at 60° .

Smith, Cass, *J. Am. Chem. Soc.*, 1932, 54, 1609.

Smith, *Organic Syntheses*, 1931, XI, 66.

Eisenlohr, *Fortschritte der Chemie, Physik und physikalische Chemie*, 1925, 18, 521.

Isodurenol (4-Hydroxy-1 : 2 : 3 : 5-tetramethylbenzene, hydroxyisodurene, 2 : 3 : 4 : 6-tetramethylphenol)



$\text{C}_{10}\text{H}_{14}\text{O}$ MW, 150

M.p. $79-81^\circ$. B.p. $230-50^\circ$. Br in $\text{AcOH} \rightarrow$ monobromo deriv., m.p. 135° (*acetyl*: m.p. 98°).

Et ether: $\text{C}_{12}\text{H}_{18}\text{O}$. MW, 178. B.p. $236-7^\circ$.

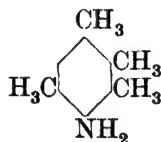
Benzoyl: m.p. $71-2^\circ$.

Phenylurethane: m.p. $178-9^\circ$.

Hey, *J. Chem. Soc.*, 1931, 1590.

Noelting, Baumann, *Ber.*, 1885, 18, 1150.

Isoduridine (4-Aminoisodurene, 4-amino-1 : 2 : 3 : 5-tetramethylbenzene)



$\text{C}_{10}\text{H}_{15}\text{N}$ MW, 149

M.p. $23-4^\circ$. B.p. 255° .

N-Acetyl: 2 : 3 : 4 : 6-tetramethylacetanilide.

$\text{C}_{12}\text{H}_{17}\text{ON}$. MW, 191. White needles. M.p. 217.5° (215° , $210-11^\circ$).

Picrate: m.p. $199-200^\circ$ decomp.

See previous references.

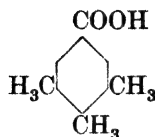
Isodurool.

See Isodurene.

Isoduryl Aldehyde.

See 2 : 4 : 6-Trimethylbenzaldehyde.

α -Isodurylic Acid (3 : 4 : 5-Trimethylbenzoic acid)



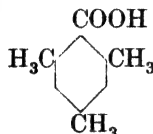
$C_{10}H_{12}O_2$ MW, 164
Needles from H_2O . M.p. 215–16°. Sol. EtOH, Et_2O . Spar. sol. boiling H_2O . Insol. cold H_2O . Volatile in steam.

Jacobsen, *Ber.*, 1882, 15, 1855.

Jannasch, Weiler, *Ber.*, 1894, 27, 3444.

Cf. Bielefeldt, *Ann.*, 1879, 198, 380.

β -Isodurylic Acid (2 : 4 : 6-Trimethylbenzoic acid)



$C_{10}H_{12}O_2$ MW, 164

Prisms from ligroin. M.p. 155° (152–3°). Distills undecomp. Sol. EtOH, Et_2O , $CHCl_3$, Me_2CO . $k = 3.75 \times 10^{-5}$ at 25°. Difficult to esterify by $MeOH + HCl$ gas. Hot H_2SO_4 , hot H_3PO_4 , or HI at 140° \rightarrow mesitylene.

Me ester: $C_{11}H_{14}O_2$. MW, 178. B.p. 241–2°/718 mm.

Amide: $C_{10}H_{13}ON$. MW, 163. Cryst. from C_6H_6 . M.p. 187–8°.

Nitrile: 2 : 4 : 6-trimethylbenzonitrile. $C_{10}H_{11}N$. MW, 145. Plates from C_6H_6 . M.p. 55°. B.p. 225–30°, 122–5°/16 mm. Stable to alkalis.

Fuson, Matuszeski, Gray, *J. Am. Chem. Soc.*, 1934, 56, 2099.

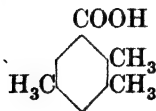
Houben, Fischer, *Ber.*, 1933, 66, 348; 1930, 63, 2467.

Grignard, Bellet, Courtot, *Ann. chim.*, 1915, 4, 46.

Bamford, Simonsen, *J. Chem. Soc.*, 1910, 97, 1906.

Hantzsch, Lucas, *Ber.*, 1895, 28, 748.

γ -Isodurylic Acid (2 : 3 : 5-Trimethylbenzoic acid)



$C_{10}H_{12}O_2$ MW, 164

Plates from ligroin. M.p. 127°. Volatile in steam.

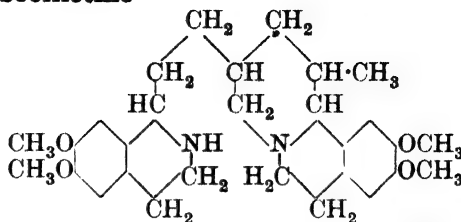
Jannasch, Weiler, *Ber.*, 1894, 27, 3444.

Cf. Bielefeldt, *Ann.*, 1879, 198, 380.

Isoelemicin.

See Elemicin.

Isoemetine



$C_{29}H_{40}O_4N_2$ MW, 480

Stereoisomer of emetine, from ipecacuanha. Needles + $1H_2O$ from Et_2O or $AcOEt$. M.p. 97–8° (softens at 92°). Sol. ord. org. solvents. Insol. pet. ether, H_2O . $[\alpha]_D - 47.4^\circ$ in $CHCl_3$.

B,2HCl: needles from EtOH. M.p. 310° decomp.

B,2HBr: prisms + $4H_2O$ from H_2O . M.p. 215–20°.

B,2(COOH)_2: prisms + $5H_2O$ from H_2O . M.p. 92–5°.

N-Benzoyl: prisms from Me_2CO . M.p. 207–8°. $[\alpha]_D + 48.9^\circ$ in $CHCl_3$.

N-Me: plates from Et_2O . M.p. 152–3°. $[\alpha]_D - 50^\circ$ in $CHCl_3$. *Methiodide*. Prisms. M.p. 290–2°. $[\alpha]_D + 92.6^\circ$ in H_2O .

Pyman *et al.*, *J. Chem. Soc.*, 1927, 1068;

1918, 113, 226; 1917, 111, 439.

Cf. Karrer, *Ber.*, 1917, 50, 582.

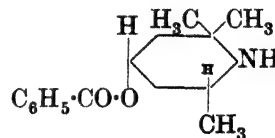
Isoephedrine.

See ψ -Ephedrine.

Isoerucic Acid.

See Brassidic Acid.

Iso- β -eucaine (O-Benzoyl- β -vinylldiacetonalkamine)



$C_{15}H_{21}O_2N$ MW, 247

The enantiomorphic and racemic forms of the free base are all uncrystallizable syrups.

d-.

B,HCl: needles from H_2O . M.p. 271–3°. $[\alpha]_{5461} + 17.0^\circ$ in H_2O .

l-.

B,HCl: glistening needles. M.p. 271–3°. $[\alpha]_{5461} - 16.3^\circ$ in H_2O .

dl-.

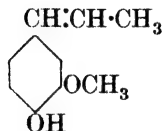
B,HCl: silky needles or plates from hot H_2O . M.p. 269–71°.

Picrate: rectangular leaflets from dil. EtOH. M.p. 256–8°.

N-Benzoyl: *ON*-dibenzoyl- β -vinylidiacetonalkamine. Flat prisms from Et₂O. M.p. 114–15°.

King, *J. Chem. Soc.*, 1924, 125, 45.

Isoeugenol (4-Hydroxy-3-methoxy-1-propenylbenzene, 5-propenylguaiacol, 2-methoxy-4-propenylphenol)



C₁₀H₁₂O₂

MW, 164

Occurs in ylang-ylang and other essential oils. The technical product (obtained from eugenol) is a liq. mixture of *cis*- and *trans*-forms. B.p. 266°, 147.2°/20 mm., 140.2°/16 mm., 131.8°/10 mm., 118°/5 mm. D₄²⁰ 1.080. n_D²⁰ 1.5739. Sol. EtOH, Et₂O. Spar. sol. H₂O. Heat of comb. C_p 1278.1 Cal. 1 : 3 : 5-Trinitrobenzene \rightarrow comp., red needles, m.p. 70°. With acid reagents on standing \rightarrow di-isoeugenol, C₂₀H₂₄O₄, needles, m.p. 181° (*di-acetate*, m.p. 150–1°; *dibenzoate*, m.p. 161°; *di-Me ether*, m.p. 106°; *di-Et ether*, m.p. 130°). Ox. by various reagents \rightarrow vanillin.

Hirao, *Chem. Abstracts*, 1933, 27, 2944, 5731.

Haraszti, Széki, *Ann.*, 1933, 504, 298.

Riedel, de Häen A.G., D.R.Ps., 545,913, 547,026, 548,282, (*Chem. Abstracts*, 1932, 26, 3522).

Stockelbach, U.S.P., 1,792,716, (*Chem. Abstracts*, 1931, 25, 2154).

Priester, *Chem. Abstracts*, 1931, 25, 1632.

Cis:

B.p. 134–5°/13 mm., 115°/5 mm., 98°/1–2 mm. D₄²⁰ 1.0851. n_D²⁰ 1.5726. FeCl₃ \rightarrow olive-green col.

4-Me ether: 3 : 4-dimethoxy-1-propenylbenzene, 4-propenylveratrol. C₁₁H₁₄O₂. MW, 178. B.p. 138–40°/12 mm. D₄²⁰ 1.0521. n_D²⁰ 1.5616.

Formyl: C₁₁H₁₂O₃. MW, 192. B.p. 155–60°/20 mm., 117–18°/1.5 mm. D₁₅¹⁵ 1.208. n_D²⁰ 1.5552.

Acetyl: C₁₂H₁₄O₃. MW, 206. B.p. 160–2°/13 mm., 132°/5 mm. n_D²⁰ 1.5418. *Dibromide*: m.p. 78–9°.

Benzoyl: m.p. 68° (59–61°).

Phenylurethane: m.p. 118°.

Trans:

M.p. 33–4°. B.p. 141–2°/13 mm. D₄²⁰ 1.0852. n_D²⁰ 1.5782. Stable in absence of air. FeCl₃ \rightarrow greenish-yellow col.

4-Me ether: m.p. 16–17°. B.p. 143–4°/11 mm. D₄²⁰ 1.0528. n_D²⁰ 1.5692.

4-Et ether: 3-methoxy-4-ethoxy-1-propenylbenzene. C₁₂H₁₆O₂. MW, 192. Needles from EtOH.Aq. M.p. 64°.

4-Benzyl ether: C₁₇H₁₈O₂. MW, 254. Needles from EtOH. M.p. 58–9°.

4-[2 : 4-Dinitrophenyl] ether: m.p. 129–30°.

Acetyl: m.p. 79°. *Dibromide*: m.p. 132–3°.

Propionyl: C₁₃H₁₆O₃. MW, 220. B.p. 288–92°, 181–5°/40 mm.

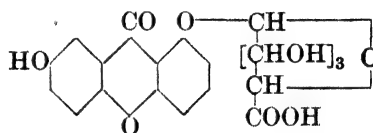
Benzoyl: m.p. 102–3° (106°).

p-Nitrobenzoyl: m.p. 123–4°.

Junge, *Chem. Abstracts*, 1933, 27, 4530.

Boedecker, Volk, *Ber.*, 1931, 64, 61.

Isoeuxanthic Acid



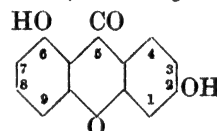
C₁₉H₁₆O₁₀

MW, 404

Yellow needles from MeOH. M.p. 157–9°. [α]_D – 87.4° in 70% EtOH. Hyd. by emulsin.

Neuberg, Neimann, *Z. physiol. Chem.*, 1905, 44, 120.

Isoeuxanthone (2 : 6-Dihydroxyxanthone)



C₁₃H₈O₄

MW, 228

Yellow needles from EtOH.Aq. M.p. 245–6°. Sol. EtOH, Et₂O. Insol. H₂O. EtOH sol. + FeCl₃ \rightarrow greyish-green col.

Diacetyl: m.p. 124–30°.

2-Me ether: C₁₄H₁₀O₄. MW, 242. Yellow leaflets. M.p. 143–4°. *6-Acetyl*: m.p. 150°.

Di-Et ether: C₁₇H₁₆O₄. MW, 284. M.p. 185°.

Graebe, *Ann.*, 1889, 254, 302.

Kostanecki, *Ber.*, 1894, 27, 1991.

Meyer, Conzetti, *Ber.*, 1897, 30, 971.

β -Isoeuxanthone (3 : 7-Dihydroxyxanthone).

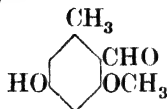
Yellow needles from EtOH or Et₂O. M.p. above 330°. Sublimes. Sol. EtOH, Et₂O, alkalis.

Diacetyl: needles from EtOH. M.p. 175°.

Di-Me ether: C₁₅H₁₂O₄. MW, 256. Needles from C₆H₆. M.p. 180°.

Baeyer, *Ann.*, 1910, 372, 139.

Graebe, *Ann.*, 1889, 254, 302.

Isoeverninaldehyde (5-Hydroxy-3-methoxy-o-toluic aldehyde) $C_9H_{10}O_3$

MW, 166

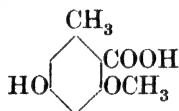
Cryst. from 50% MeOH. M.p. 196°.

O-Acetyl: $C_{11}H_{12}O_4$. MW, 208. Prisms from pet. ether. M.p. 85°. Phototropic (colourless in dark, deep yellow in light).

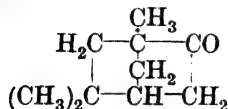
O-Carbomethoxyl: cryst. from pet. ether. M.p. 81°.

Me ether: 2-methoxy-6-methylanisaldehyde. $C_{10}H_{12}O_3$. MW, 180. Needles from ligroin. M.p. 62°.

Oxime: needles from ligroin. M.p. 127°.

Canter, Robertson, Waters, *J. Chem. Soc.*, 1933, 495.Gattermann, *Ann.*, 1907, 357, 346.**Isoeverninic Acid** (5-Hydroxy-3-methoxy-o-toluic acid, orsellinic acid 3-methyl ether) $C_9H_{10}O_4$

MW, 182

Prisms from AcOEt-ligroin. M.p. 175° decomp. Sol. EtOH, Me_2CO , AcOEt. Spar. sol. Et_2O , C_6H_6 , ligroin. $FeCl_3 \rightarrow$ reddish-yellow col.O-Carbomethoxyl: $C_{11}H_{12}O_6$. MW, 240. Needles from AcOEt-ligroin. M.p. 145°.Me ester: $C_{10}H_{12}O_4$. MW, 196. Needles from C_6H_6 . M.p. 112°. O-Carbomethoxyl: cryst. from pet. ether. M.p. 87°. Anilide: m.p. 149–50°.See first reference above and also Fischer, Hoesch, *Ann.*, 1912, 391, 370.**Isofenchene.**See δ -Fenchene.**Isofenchone** $C_{10}H_{16}O$

MW, 152

d.

Oil. B.p. 201°. $D^{18.5}_D$ 0.943. $n^{18.5}_D$ 1.4621. $[\alpha]_D + 90.35^\circ$.

Oxime: m.p. 82°.

Semicarbazone: m.p. 220.5°.

l.

B.p. 200–1°. D^{20}_D 0.9427. n^{20}_D 1.4613. $[\alpha]_D - 6.68^\circ$ in EtOH.

Oxime: m.p. 82°.

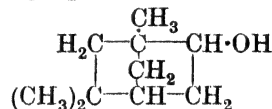
Semicarbazone: m.p. 220–1°.

dl.

Hydrazone: m.p. 111–12°. Acetyl deriv.: needles. M.p. 193–4°.

Oxime: m.p. 133°.

Semicarbazone: m.p. 224–5°.

Komppa, Hasselström, *Ann.*, 1932, 496, 167.Komppa, Roschier, *Ann.*, 1929, 470, 156.Nametkin, *Chem. Zentr.*, 1916, II, 253.Wallach, *Ann.*, 1908, 362, 194, 200; 363, 4.**Isofenchyl Alcohol** (1 : 3 : 3 - Trimethyl-bicyclo-[1, 2, 2]-heptanol-6) $C_{10}H_{18}O$

MW, 154

l.

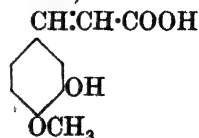
M.p. 60.5–61°. B.p. 197–9°. $[\alpha]^{24}_D - 19.92^\circ$ (– 27.04° in EtOH). D^{20}_D 0.8300.Xanthogenic amide: $C_{10}H_{17}O \cdot CS \cdot NH_2$. Needles from pet. ether. M.p. 69–70°. $[\alpha]_D - 37.8^\circ$ in EtOH. Heat at 160–80° \rightarrow δ -fenchene.Acetate: b.p. 108–9°/20 mm. D^{20}_D 0.9639. n^{24}_D 1.4557. $[\alpha]^{24}_D - 34.95^\circ$.

Phenylurethane: m.p. 106–7°.

dl.

Prisms. M.p. 43°. B.p. 202–3°, 85°/10 mm. D^{20}_D 0.9543. n^{20}_D 1.4766.Acetate: b.p. 106–8°/20 mm., 89–90°/10 mm. D^{20}_D 0.9684. n^{20}_D 1.4581.

Phenylurethane: m.p. 94–5°.

Komppa, Hasselström, *Chem. Abstracts*, 1927, 21, 2679.Nametkin et al., *J. prakt. Chem.*, 1923, 106, 33.Qvist, *Ann.*, 1918, 417, 312, 316.Wallach, *Ann.*, 1908, 362, 191, 200; 363, 5.**Isoferulic Acid** (Caffeic acid 4-methyl ether, hesperetic acid, hesperetic acid, 3-hydroxy-4-methoxycinnamic acid) $C_{10}H_{10}O_4$

MW, 194

Needles. M.p. 228° (222°). Very sol. EtOH, Et₂O. Spar. sol. cold H₂O, CHCl₃, C₆H₆. Insol. pet. ether.

Me ester: acetate, C₁₃H₁₄O₅. MW, 250. Leaflets. M.p. 116°. *Benzoate*, C₁₈H₁₆O₅. MW, 312. Needles. M.p. 120°.

Acetyl: cryst. from dil. EtOH. M.p. 199°.

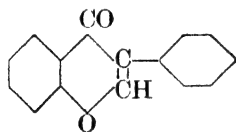
Carbomethoxyl: C₁₂H₁₂O₆. MW, 252. M.p. 223–4° decomp.

Robinson, Sugawara, *J. Chem. Soc.*, 1931, 3169.

Pacsu, Stieber, *Ber.*, 1929, 62, 2974.

Mauthner, *J. prakt. Chem.*, 1923, 106, 333; 1922, 104, 135.

Isoflavone (3-Phenylchromone)



C₁₅H₁₀O₂ MW, 222

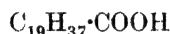
Cryst. from pet. ether. M.p. 148°.

Joshi, Venkataraman, *J. Chem. Soc.*, 1934, 513.

Isoform.

See *p*-Iodoxyanisole.

Isogadoleic Acid



C₂₀H₃₈O₂ MW, 310

Acid of the oleic series, isomeric with gadoleic acid. Cryst. M.p. 65.5–66°. Sol. hot EtOH, Et₂O, CHCl₃, pet. ether. Spar. sol. Me₂CO.

K salt: amorphous powder, Spar. sol. H₂O, EtOH.

Hashimoto, *J. Am. Chem. Soc.*, 1925, 47, 2325.

Isogalipine



C₂₀H₂₁O₃N MW, 323

Isomer of the angostura alkaloid galipine. Silky needles. M.p. 165°.

B, HCl: plates + 5H₂O. M.p. 234°.

B, HBr: prisms + 1H₂O. M.p. 223°.

B, HI: prisms + 1H₂O. M.p. 206°.

B, H₂PtCl₆: prisms + 4H₂O. M.p. 198–9° decomp.

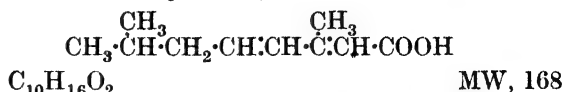
Troeger, Bönicke, *Arch. Pharm.*, 1920, 258, 260 (*J. Chem. Soc.*, 1921, 120, i, 121).

Isogentisin.

See under Gentisein.

Dict. of Org. Comp.—II.

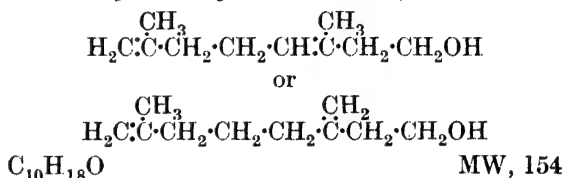
Isogeranic Acid (2 : 6-Dimethyl-1 : 3-heptadiene-1-carboxylic acid)



B.p. 151–4°/14 mm. D₁₇ 0.959. n_D 1.49194. KMnO₄ → isovaleric acid.

Tiemann, Tigges, *Ber.*, 1900, 33, 564.

Isogeraniol (2 : 6-Dimethyl-1 : 5-octadienol-8 or 2-methyl-6-methylene-1-octenol-8)



Oil with rose odour. B.p. 102–3°/9 mm. D₂₀ 0.8787. n_D 1.47325.

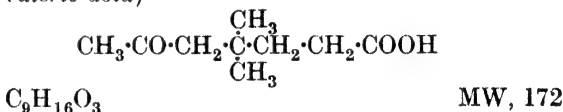
Diphenylurethane: m.p. 73°.

Semmler, Schossberger, *Ber.*, 1911, 44, 991.

Isogeraniolene.

See 2 : 6-Dimethylheptadiene-1 : 3.

Isogeronic Acid (3 : 3-Dimethyl-4-aceto-n-valeric acid)



Oil. B.p. 162–7°/10 mm. Sol. H₂O, EtOH, Et₂O.

Semicarbazone: m.p. 198° (193–5°).

2 : 4-Dinitrophenylhydrazones: m.p. 140–1°.

Wallach, *Ann.*, 1902, 324, 109.

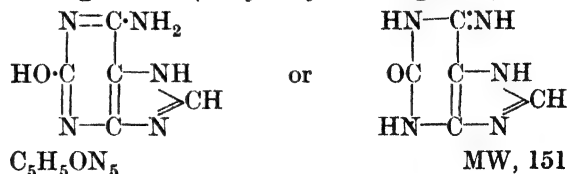
Tiemann, *Ber.*, 1900, 33, 3707.

Strain, *J. Biol. Chem.*, 1933, 102, 146.

Isoglutamine.

See under Glutamic Acid.

Isoguanine (2-Hydroxy-6-aminopurine)



The aglucone of crotonoside from *Croton tiglium*, Linn., in which it occurs with *d*-ribose. Amorphous powder. Carbonises above 250°. Does not form xanthine with HNO₃ nor guanidine with HCl + KClO₃. Couples with diazonium salts.

B.HCl: decomp. 250°.

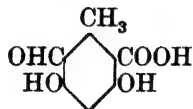
B.HBr: decomp. 214°.

B₂H₂SO₄: prisms + 1H₂O from dil. H₂SO₄.
Not dehydrated at 130° in vacuo. M.p. 230–50°
decomp.

Picrate: micro-cryst. Decomp. above 260°.

Cherbuliez, Bernhard, *Helv. Chim. Acta*,
1932, 15, 464.

Isohæmatommic Acid (3:5-Dihydroxy-6-
aldehydo-o-toluic acid, 6-aldehydo-orsellinic acid)



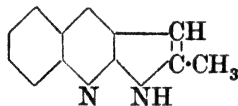
C₉H₈O₅ MW, 196

Needles from EtOH.Aq. M.p. 224–5° de-
comp.

Et ester: C₁₁H₁₂O₅. MW, 224. Needles from
EtOH.Aq. M.p. 94°. Sublimes in vacuo.
FeCl₃ on aq. sol. → reddish-brown col. FeCl₃
on EtOH sol. → purple col.

St. Pfau, *Helv. Chim. Acta*, 1933, 16, 283.

Isoharman



C₁₂H₁₀N₂ MW, 182

Leaflets from MeOH. M.p. 213–15°. Sub-
limes without decomp. H₂O sol. does not
fluoresce. Sol. conc. H₂SO₄ with bluish-violet
fluor.

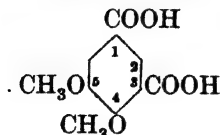
Picrate: needles. M.p. 253° decomp. (darkens
at 240°).

Perkin, Robinson, *J. Chem. Soc.*, 1913,
103, 1973.

Isohelenin

See Isoalantolactone.

Isohemipinic Acid (4:5-Dimethoxyiso-
phthalic acid, catechol-3:5-dicarboxylic acid
dimethyl ether, veratrol-3:5-dicarboxylic acid)



C₁₀H₁₀O₆ MW, 226

Needles from H₂O. M.p. 245–6°. Sol. EtOH,
Et₂O. Mod. sol. hot H₂O.

1-Me ester: C₁₁H₁₂O₆. MW, 240. Needles.
M.p. 167°.

Tiemann, Mendelsohn, *Ber.*, 1877, 10, 398.

Isoheptane (2-Methylhexane)



C₇H₁₆ MW, 100

M.p. –119.1°. B.p. 90°. D₄²⁰ 0.6789. n_D²⁰
1.3851.

Edgar, Calingaert, Marker, *J. Am. Chem.*
Soc., 1929, 51, 1483.

Chavanne, Simon, *Compt. rend.*, 1919,
168, 1325.

Tafel, *Ber.*, 1909, 42, 3146.

Isoheptanol-2.

See 2-Methylhexanol-2.

1:2-Isoheptene.

See 5-Methyl-1-hexene.

1-Isoheptenic Acid (2-Isobutylacrylic acid,
4-methyl-1-hexenic acid)



C₇H₁₂O₂ MW, 128

M.p. 16.5°. B.p. 226–7°, 123–4°/15 mm. D₄²⁰
0.942. n_D¹⁷ 1.4425. Volatile in steam.

Et ester: C₉H₁₆O₂. MW, 156. B.p. 190°.
D₄²⁰ 0.889.

p-Bromophenacyl ester: m.p. 87–8°.

Chloride: C₇H₁₁OCl. MW, 146.5. B.p. 64°/
12 mm. D₄²⁰ 0.991.

Amide: C₇H₁₃ON. MW, 127. M.p. 127–8°.

Nitrile: C₇H₁₁N. MW, 109. B.p. 65°/13
mm. D₄²⁰ 0.823.

Auwers, *et al.*, *Ann.*, 1923, 432, 46, 79.

2-Isoheptenic Acid (4-Methyl-2-hexenic acid,
4-methylhydrosorbic acid, 3-isobutylidenepropionic
acid)



C₇H₁₂O₂ MW, 128

B.p. 216–17°. Sol. 110 parts cold H₂O.

Nitrile: C₇H₁₁N. MW, 109. B.p. 175°,
80°/18 mm.

Strassmann, *Monatsh.*, 1897, 18, 726.

Fittig, Feurer, *Ann.*, 1894, 283, 129.

Knoevenagel, D.R.P., 156,560, (*Chem.*
Zentr., 1905, I, 56).

3-Isoheptenic Acid (4-Methyl-3-hexenic acid,
3-isopropylidenebutyric acid)



C₇H₁₂O₂ MW, 128

B.p. 216–18°, 113–15°/12 mm. D₄²⁰ 0.9864.
n_D¹⁷ 1.45041.

Et ester: C₉H₁₆O₂. MW, 156. B.p. 182–5°.
D₄²⁰ 0.928.

Amide: $C_7H_{13}ON$. MW, 127. Cryst. M.p. 85–6°.

Komppa, Rohrmann, *Ann.*, 1934, 509, 265.

Ssolonina, *Chem. Zentr.*, 1902, I, 629.

Léser, *Compt. rend.*, 1899, 128, 372.

Isoheptoic Acid.

See Isoamylacetic Acid.

Isoheptyl Alcohol (5-Methylhexanol-1, 5-methyl-n-hexyl alcohol)



$C_7H_{16}O$ MW, 116

B.p. 170.5°/755 mm. D_{20}^{25} 0.8192. Very spar. sol. H_2O .

Phenylurethane: m.p. 82.5°.

Levene, Allen, *J. Biol. Chem.*, 1916, 27, 443.

Isoheptylic Acid.

See Isoamylacetic Acid.

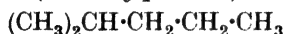
Isohexacosane (Cerane)

$C_{26}H_{54}$ MW, 366

Scales from Et_2O . M.p. 61°. B.p. 207°/1 mm.

Levene, West, Scheer, *J. Biol. Chem.*, 1915, 20, 532.

Isohexane (2-Methylpentane)



C_6H_{14} MW, 86

B.p. 62.3–63.3° (61°). D_{20}^{20} 0.6608, D_{20}^{25} 0.6599. n_D^{20} 1.3735.

Kishner, *Chem. Zentr.*, 1912, I, 2026.

Chavanne, Simon, *Compt. rend.*, 1919, 168, 1324.

Isohexene.

See 4-Methyl-1-pentene, 2-Methyl-2-pentene, and 4-Methyl-2-pentene.

Isohexenic Acid.

See 2-Isopropylacrylic Acid.

Isohexylacetic Acid.

See 5-Methyl-n-heptylic Acid.

Isohexyl Alcohol (4-Methyl-n-amyl alcohol, 4-methylpentanol-1, isoamylcarbinol)



$C_6H_{14}O$ MW, 102

B.p. 152–3°. D_{20}^{20} 0.811. n_D^{25} 1.4134.

Acetate: b.p. 159°/155 mm.

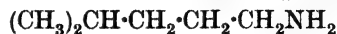
3 : 5-Dinitrobenzoate: m.p. 70°.

Phenylurethane: m.p. 48°.

Norris, Cortese, *J. Am. Chem. Soc.*, 1927, 49, 2644.

Levene, Allen, *J. Biol. Chem.*, 1916, 27, 450.

Isohexylamine (5-Aminoisoheptane, 4-methyl-n-amylamine, 5-amino-2-methyl-n-pentane)



$C_6H_{15}N$ MW, 101

Strongly basic liq. B.p. 125° (122–3°). D_4^{25} 0.758. Spar. sol. H_2O . Absorbs CO_2 .

B, HCl : m.p. 220°.

B_2, H_2PtCl_6 : decomp. at 200°.

$B, HgCl_2$: m.p. 185–7°.

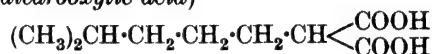
$B_2, (COOH)_2$: needles. M.p. 166°.

Picrate: m.p. 123–5°.

Curtius, et al., *J. prakt. Chem.*, 1930, 125, 164.

Sabatier, Senderens, *Compt. rend.*, 1905, 140, 484.

Isohexylmalonic Acid (2-Methylhexane-6 : 6-dicarboxylic acid)



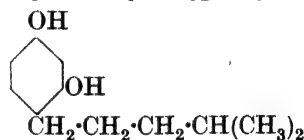
$C_9H_{16}O_4$ MW, 188

Cryst. from C_6H_6 . M.p. 86.5°. Mod. sol. H_2O . Insol. pet. ether.

Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 137°/11 mm.

Levene, Allen, *J. Biol. Chem.*, 1916, 27, 451.

4-Isohexylresorcinol (2 : 4-Dihydroxyiso-hexylbenzene, 5-[2 : 4-dihydroxyphenyl]-isoheptane)



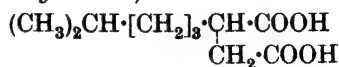
$C_{12}H_{18}O_2$ MW, 194

M.p. 70–71.5°. B.p. 182–3°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, 48, 1692.

Cox, *Rec. trav. chim.*, 1931, 50, 848.

Isohexylsuccinic Acid (2-Methylheptane-6 : 7-dicarboxylic acid)



$C_{10}H_{18}O_4$ MW, 202

Needles from Et_2O -pet. ether. M.p. 73–4°. Sol. H_2O , $EtOH$, Et_2O . Insol. ligroin, pet. ether.

Longinow, *Chem. Zentr.*, 1916, I, 1054.

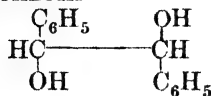
Isohomocatechol.

See 2 : 3-Dihydroxytoluene.

Ischomoveratrol.

See under 2 : 3-Dihydroxytoluene.

Isohydrobenzoin



$\text{C}_{14}\text{H}_{14}\text{O}_2$
d.

MW, 214

Fine needles from H_2O . M.p. 146° . Spar. sol. boiling H_2O . $[\alpha]_D + 92^\circ$ in EtOH.

Acetone deriv.: prisms from Et_2O . M.p. 48° . $[\alpha]_D + 65.2^\circ$ in EtOH.

l.

Leaflets from C_6H_6 . M.p. 146° . Very sol. MeOH, EtOH, Me_2CO , AcOEt, hot CHCl_3 . Mod. sol. hot C_6H_6 , Et_2O . $[\alpha]_D - 92^\circ$, $[\alpha]_{5461} - 111^\circ$, in EtOH.

Diacetyl: prisms from EtOH. M.p. $109-10^\circ$. $[\alpha]_D + 26.9^\circ$ in EtOH.

Mono-Et ether: $\text{C}_{16}\text{H}_{18}\text{O}_2$. MW, 242. Needles. M.p. $45-50^\circ$. $[\alpha]_D - 34.6^\circ$ in EtOH.

Benzylidene deriv.: needles from EtOH. M.p. 70.5° . $[\alpha]_D - 27.6^\circ$ in EtOH.

dl.

M.p. 119° .

Benzylidene deriv.: m.p. 84° .

Read, Campbell, Barker, *J. Chem. Soc.*, 1929, 2305.

Read, Campbell, *J. Chem. Soc.*, 1930, 2383.

Isohydrosorbic Acid.

See 2-Propylacrylic Acid.

Isohydroxyaminodibenzyl.

See under α -Hydroxy- β -aminodibenzyl.

Isohydroxycuminic Acid.

See 2-Hydroxycuminic Acid.

Isohyenanchin

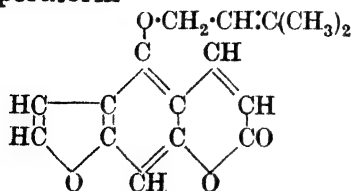
$\text{C}_{15}\text{H}_{18}\text{O}_7$

MW, 310

Constituent of *Hyenanche globosa*, Lamb (*Toxicodendron capense*, Thunb.). Needles from H_2O . M.p. 299° decomp. (brown at 245°). Spar. sol. H_2O , EtOH, AcOEt. $[\alpha]_D^{15} - 61.3^\circ$ in H_2O . Reduces Fehling's and $\text{NH}_3\cdot\text{AgNO}_3$. Non-toxic.

Henry, *J. Chem. Soc.*, 1920, 117, 1622.

Isoimperatorin



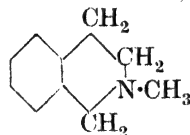
$\text{C}_{16}\text{H}_{14}\text{O}_4$

MW 270

Constituent of fish-poison plant *Imperatoria ostruthium*. Cryst. from C_6H_6 . M.p. 109° . Optically inactive. $\text{H}_2\text{O}_2 + \text{KOH}$ in MeOH \rightarrow furan-2 : 3-dicarboxylic acid. $\text{CH}_3\cdot\text{COOH} + \text{H}_2\text{SO}_4 \rightarrow$ a phenol, m.p. 277° decomp. which with diazomethane \rightarrow bergaptene, etc.

Späth, Kahovec, *Ber.*, 1933, 66, 1116.

Isokairolone (N-Methyl-1 : 2 : 3 : 4-tetrahydro-isoquinoline)



$\text{C}_{10}\text{H}_{13}\text{N}$

MW, 147

Oil. B.p. 212° . Odour strongly resembling NH_3 . Anaesthetic.

B, HCl: m.p. 228° .

B, H₂PtCl₆: decomp. at 209° .

Picrate: yellow cryst. Decomp. at $148-50^\circ$.

Methiodide: cryst. from EtOH. M.p. 189° . Sol. H_2O .

Ethiodide: cryst. from EtOH. M.p. $132-3^\circ$.

Methoaurichloride: yellow plates from H_2O . M.p. $184-5^\circ$.

Methochloroplatinate: orange-yellow needles. M.p. 228° .

Ferranti, *Gazz. chim. ital.*, 1903, 23, ii, 410.

Wedekind, Oechslen, *Ber.*, 1901, 34, 3987.

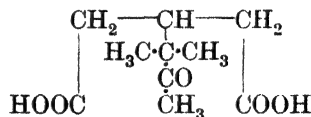
Isokessyl Alcohol.

See under Kessyl Alcohol.

Isokessyl Ketone.

See under Kessyl Ketone.

Isoketocamphoric Acid



$\text{C}_{10}\text{H}_{16}\text{O}_5$

MW, 216

Prisms from H_2O , needles from CHCl_3 -ligroin. M.p. 130° . Sol. H_2O , EtOH. Very spar. sol. Et_2O . $\text{CrO}_3 \rightarrow$ isocamphoronic acid.

Lactone: $\text{C}_{10}\text{H}_{14}\text{O}_4$. MW, 198. Needles from AcOEt-ligroin. M.p. $180-5^\circ$.

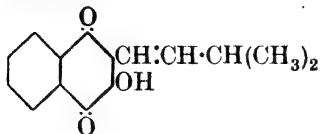
Oxime: needles from H_2O . M.p. $185-6^\circ$.

Semicarbazone: prisms from H_2O . M.p. 187° .

Bredt-Savelsberg, Buchkremer, *Ber.*, 1931, 64, 605.

Tiemann, *Ber.*, 1896, 29, 3017, 3024.

Isolapachol (3-Hydroxy-2-[γ -methyl- α -butenyl]- α -naphthoquinone)



$C_{15}H_{14}O_3$

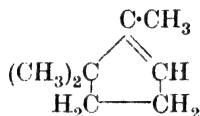
MW, 242

Brick-red needles. M.p. 120°. Very sol. ord. org. solvents. Sol. KOH.Aq. \rightarrow intense purple sol.

Acetyl: yellow needles from EtOH. M.p. 74°.

Hooker, *J. Chem. Soc.*, 1896, **69**, 1362.

Isolauroleone (1:5:5-Trimethylcyclopentene)



C_8H_{14}

MW, 110

B.p. 109°/754 mm. D_4^{20} 0.7824. n_D^{20} 1.4324. Reduces Tollens' reagent on warming.

Kondakov, Schindelmeizer, *Chem. Abstracts*, 1912, **6**, 481.

Kishner, *Chem. Zentr.*, 1911, **I**, 544.

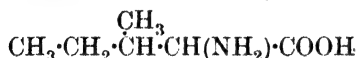
Isolauroleonic Acid.

β -Campholytic Acid, *q.v.*

Isolauronolic Acid.

See β -Campholytic Acid.

Isoleucine (1-Amino-2-methyl-n-valeric acid)



$C_6H_{13}O_2N$

MW, 131

d.

M.p. 283-4° decomp. $[\alpha]_D^{20}$ - 10.7° in H_2O , - 41.6° in 20% HCl.

N-Formyl: m.p. 156°. $[\alpha]_D^{20}$ - 26.8° in EtOH.

N-Chloroacetyl: m.p. 72-4°. $[\alpha]_D^{20}$ - 26.1°.

N-Benzenesulphonyl: m.p. 153-4°. $[\alpha]_D^{20}$ + 14.3° in *N*-NaOH, - 25.5° in EtOH.

Phenylisocyanate deriv.: m.p. 119-21°. $[\alpha]_D^{20}$ - 15.0° in NaOH, - 36.3° in EtOH.

α -Naphthylisocyanate deriv.: m.p. 177-8°. $[\alpha]_D^{20}$ - 29.5° in EtOH.

d. "Allo."

Leaflets. M.p. 274-5° decomp. Sol. 34 parts H_2O at 20°. $[\alpha]_D^{20}$ - 14.2° in H_2O , - 38.0° in 20% HCl.

N-Formyl: m.p. 126°. $[\alpha]_D^{20}$ - 25.2° in EtOH.

N-Chloroacetyl: oil.

N-Benzenesulphonyl: m.p. 147-8°. $[\alpha]_D^{20}$ - 30.7° in EtOH.

Phenylisocyanate deriv.: m.p. 151°. $[\alpha]_D^{20}$ - 16.8° in NaOH, - 30.6° in EtOH.

α -Naphthylisocyanate deriv.: m.p. 168°. $[\alpha]_D^{20}$ - 25.5° in EtOH.

l.

Found in residues from beet sugar manufacture and as a hydrolytic product of albumen. Cryst. from 80% EtOH. M.p. 285-6° decomp. $[\alpha]_D^{20}$ + 10.7° in H_2O , + 40.8° in 20% HCl.

N-Formyl: m.p. 155°. $[\alpha]_D^{20}$ + 26.6° in EtOH.

N-Chloroacetyl: m.p. 71-3°. $[\alpha]_D^{20}$ + 26.0°.

N-Benzenesulphonyl: m.p. 153°. $[\alpha]_D^{20}$ - 14.4° in *N*-NaOH, + 25.3° in EtOH.

Phenylisocyanate deriv.: m.p. 121°. $[\alpha]_D^{20}$ + 14.9° in NaOH, + 37.5° in EtOH.

α -Naphthylisocyanate deriv.: m.p. 178-9°. $[\alpha]_D^{20}$ + 30.1° in EtOH.

l. "Allo."

M.p. 278° decomp. $[\alpha]_D^{20}$ + 14.0° in H_2O , + 38.1° in 20% HCl.

N-Formyl: m.p. 126°. $[\alpha]_D^{20}$ + 24.2° in EtOH.

N-Chloroacetyl: m.p. 80-6°. $[\alpha]_D^{20}$ + 19.1°.

N-Benzenesulphonyl: m.p. 147-8°. $[\alpha]_D^{20}$ + 30.7° in EtOH.

Phenylisocyanate deriv.: m.p. 151°. $[\alpha]_D^{20}$ + 16.9° in NaOH, + 30.8° in EtOH.

α -Naphthylisocyanate deriv.: m.p. 165-6°. $[\alpha]_D^{20}$ + 25.1° in EtOH.

dl.

Cryst. from EtOH.Aq. M.p. 275° (sealed tube). Mod. sol. H_2O .

N-Formyl: m.p. 121°.

N-Chloroacetyl: m.p. 105-6°.

dl. "Allo."

Et ester: $C_8H_{17}O_2N$. MW, 159. B.p. 85-8°/15 mm.

N-Formyl: m.p. 117-18°.

Abderhalden, *et al.*, *Ber.*, 1909, **42**, 3395;

Z. physiol. Chem., 1931, **195**, 121; **200**, 179; 1932, **206**, 116.

Isolinusinic Acid.

See Hexahydroxystearic Acid.

Isolongifolic Acid

$C_{14}H_{22}O_2$

MW, 222

Prismatic needles from AcOH. M.p. 136°. Mod. sol. ord. org. solvents. Insol. H_2O . $[\alpha]_{5461}$ - 12.7° in EtOH.

Me ester: $C_{15}H_{24}O_2$. MW, 236. Prisms from MeOH. M.p. 54-5°. $[\alpha]_{5461}$ + 5.94° in MeOH.

Anilide: m.p. 197°.

Bradfield, Francis, Simonsen, *J. Chem. Soc.*, 1934, 188.

Simonsen, *J. Chem. Soc.*, 1923, **123**, 2654.

Isolongifolic Aldehyde $C_{14}H_{22}O$ MW, 206

B.p. 170°/35 mm.

Semicarbazone: needles from EtOH. M.p. 210°.

Simonsen, *J. Chem. Soc.*, 1923, 123, 2655.**Isolongifolol** $C_{14}H_{24}O$ MW, 208

Needles from pet. ether. M.p. 112–14°.

Phenylurethane: needles from MeOH.Aq. M.p. 91–2°.

See previous reference.

Isolupetidine.

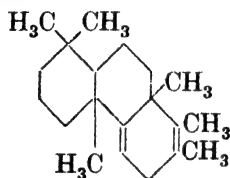
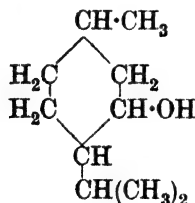
See under 2: 6-Dimethylpiperidine.

Isomalic Acid.

See Hydroxymethyl-malonic Acid.

 β -Isomalic Acid.

See Hydroxymethyl-malonic Acid.

Isomanoene $C_{20}H_{32}$ MW, 272Oil. B.p. 139–40°/0.2 mm. D_4^{15} 0.9519. n_D^{15} 1.5199. Se \rightarrow 1:2:8-trimethylphenanthrene.Hosking, Brandt, *Ber.*, 1935, 68, 37.**Isomenthol**(3-Methyl-6-isopropylcyclohexanol, p-menthanol-3) $C_{10}H_{20}O$ MW, 156

d-.

M.p. 82.5° (85°). B.p. 218°, 96.2–96.8°/10 mm. $[\alpha]_D + 25.9^\circ$.

Acid phthalate: m.p. 107.5–108.5°.

p-Nitrobenzoyl: m.p. 54°. $[\alpha]_D + 24.9^\circ$.3:5-Dinitrobenzoyl: m.p. 145°. $[\alpha]_D + 26.5^\circ$.Camphorsulphonate: m.p. 30–1°. $[\alpha]_D + 35.4^\circ$.

l-.

M.p. 82.5°.

Camphorsulphonate: m.p. 33–4°.

dl-.

Needles. M.p. 53–4°. B.p. 218.5–218.6°, 97.4°/10.5 mm.

Acid phthalate: m.p. 117° (107–8°).

p-Nitrobenzoyl: m.p. 64.5°.

3:5-Dinitrobenzoyl: m.p. 130°.

Read, Grubb, Malcolm, *J. Chem. Soc.*, 1933, 170.Zeitschel, Schmidt, *Ber.*, 1926, 59, 2307.See also Read, Grubb, *J. Chem. Soc.*, 1934, 313.**Isomenthone** (3-Methyl-6-isopropylcyclohexanone) $C_{10}H_{18}O$ MW, 154

Stereoisomer of methone.

d-.

F.p. about –35°. B.p. 212°, 86–7°/12 mm.

 D_4^{15} 0.9057. n_D^{20} 1.45302. $[\alpha]_D^{100} + 95^\circ$.

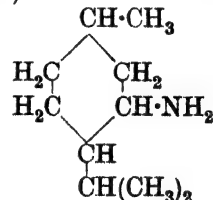
Semicarbazone: m.p. 264°.

dl-.

B.p. 210°.

Oxime: (a) m.p. 99–100°. (b) M.p. 94–5°.

Semicarbazone: (a) m.p. 225°. (b) M.p. 177–8°.

Zeitschel, Schmidt, *Ber.*, 1926, 59, 2307.Read, Robertson, Cook, *J. Chem. Soc.*, 1927, 1281.See also Rupe, Gassmann, *Helv. Chim. Acta*, 1934, 17, 283.**Isomenthylamine** (3-Methyl-6-isopropylcyclohexylamine) $C_{10}H_{21}N$ MW, 155

d-.

B.p. 87°/13.5 mm. D_4^{20} 0.8632. n_D^{25} 1.4659. $[\alpha]_D^{25} + 28.96^\circ$.

N-Formyl: m.p. 45–6°.

N-Acetyl: m.p. 77–9°.

N-Chloroacetyl: m.p. 82°.

N-Bromoacetyl: m.p. 80°.

N-Propionyl: m.p. 83°.

N-Isobutyryl: m.p. 116°.

N-Isovaleryl: m.p. 82°.

N-Benzoyl: m.p. 97–8°.

N-2-Naphthalenesulphonyl: m.p. 80–1°.

l-.

N-Benzoyl : m.p. 121°.

Tutin, Kipping, *J. Chem. Soc.*, 1904, **85**, 74.Read, Grubb, Malcolm, *J. Chem. Soc.*, 1933, 172.Read, Storey, *J. Chem. Soc.*, 1930, 2761.**Isomethylgranatoline.**

See under N-Methylgranatoline.

 α -Isomethylheptenone.

See 6-Methyl-3-heptenone-2.

 β -Isomethylheptenone.

See 2-Methyl-3-heptenone-6.

Isomethysticin.

See Methysticic Acid.

 α -Isomorphone $C_{17}H_{19}O_3N$ MW, 285Needles from MeOH-AcOEt. M.p. 246-8°. Sol. MeOH, EtOH, hot H_2O . $[\alpha]_D^{25} - 164.3^\circ$ in MeOH.

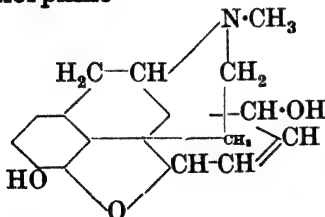
Methiodide : m.p. 276° decomp.

Schryver, Lees, *J. Chem. Soc.*, 1900, **77**, 1035; 1901, **79**, 567.Emde, *Helv. Chim. Acta*, 1930, **13**, 1047. **β -Isomorphone** $C_{17}H_{19}O_3N$ MW, 285Cryst. + $\frac{1}{2}$ EtOH from EtOH. M.p. 182°. Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O , ligroin. $[\alpha]_D^{17} - 216.2^\circ$ in MeOH.

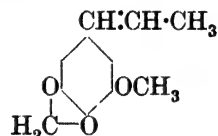
Methiodide : m.p. 250° decomp.

Schryver, Lees, *J. Chem. Soc.*, 1901, **79**, 569.

See also second reference above.

 γ -Isomorphone $C_{17}H_{19}O_3N$ MW, 285M.p. 278-9° (in vacuo). $[\alpha]_D^{20} - 93.6^\circ$ in MeOH.Small, Lutz, *J. Am. Chem. Soc.*, 1934, **56**, 1928.Emde, *Helv. Chim. Acta*, 1930, **13**, 1047.**Isomyristic Acid (11-Methyltridecylic acid)** $C_{14}H_{28}O_2$ MW, 228

Cryst. from pet. ether. M.p. 50.5-51°.

Et ester : $C_{16}H_{32}O_2$. MW, 256. B.p. 140-2°/5 mm. $n_D^{20} 1.4342$.Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, **55**, 3371.**Isomyristicin (3-Methoxy-4:5-methylenedioxy-1-propenylbenzene)** $C_{11}H_{12}O_3$ MW, 192Needles or prisms from EtOH. M.p. 44-5°. B.p. 166°/18 mm. $n_D^{45} 1.5655$.

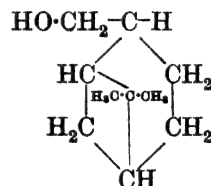
Picrate : m.p. 86°.

Thoms, *Ber.*, 1903, **36**, 3447.Scandola, *Atti accad. Lincei*, 1912, **21**, i, 53.**Isomyristyl Alcohol.**

See 12-Methyltridecyl Alcohol.

Isomyristyl bromide.

See 12-Methyltridecyl bromide.

Isomyrtanol $C_{10}H_{18}O$ MW, 154

d-.

B.p. 122°/20 mm., 113-113.8°/14 mm. $D_4^{20} 0.9830$. $n_D^{20} 1.4896$. $[\alpha]_D + 20.67^\circ$ (+ 18.0°).

Acetyl : b.p. 132.5-133.5°/26 mm.

Acid phthalate : m.p. 124.5-125.5°.

l-.

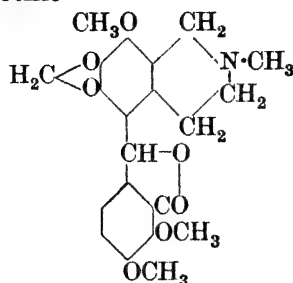
 $D_4^{20} 0.9803$. $n_D^{21} 1.4925$. $[\alpha]_D - 24.48^\circ$.

dl-.

Acid phthalate : m.p. 126.5-127.5°.

Dupont, Zacharewicz, *Compt. rend.*, 1934, **199**, 365.**Isonaphthazarin.**See 2 : 3-Dihydroxy- α -naphthoquinone.

Isonarcotine



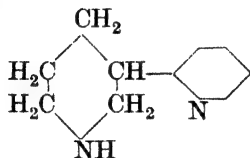
$C_{22}H_{23}O_7N$ MW, 413

M.p. 194°. Sol. EtOH, hot C_6H_6 . Spar. sol. Et_2O . Insol. H_2O , ligroin.

Freund, Fleischer, *Ber.*, 1912, **45**, 1171.

Jones, Perkin, Robinson, *J. Chem. Soc.*, 1912, **101**, 257.

Isonicotine (3-[2-Pyridyl]-piperidine, 2-[3-piperidyl]-pyridine)



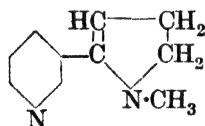
$C_{10}H_{14}N_2$ MW, 162

B.p. 282° decomp.

Picrate: m.p. 217-18°.

Smith, *J. Am. Chem. Soc.*, 1931, **53**, 281.

Isonicotine

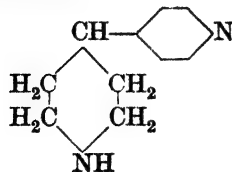


$C_{10}H_{12}N_2$ MW, 160

Occurs in Turkish tobacco. Oil. B.p. 293° decomp. D_4^{20} 1.0984. n_D^{20} 1.5749. Sol. ord. org. solvents. Spar. sol. H_2O , pet. ether.

Noga, *Chem. Zentr.*, 1915, **I**, 434.

Isonicotine (4-[4-Pyridyl]-piperidine, 4-[4-piperidyl]-pyridine)



$C_{10}H_{14}N_2$ MW, 162

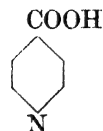
M.p. about 80°. B.p. 292°.

Picrate: m.p. 215-18° decomp.

N-Nitroso: m.p. 112°.

Smith, *J. Am. Chem. Soc.*, 1931, **53**, 282.

Isonicotinic Acid (Pyridine-4-carboxylic acid)



$C_6H_5O_2N$ MW, 123

Needles from H_2O . M.p. 315° (325-6°, sealed tube). Sublimes.

Me ester: $C_7H_7O_2N$. MW, 137. M.p. 8.5°. B.p. 207-9°, 104°/21 mm. Methiodide: m.p. 179°.

Et ester: $C_8H_9O_2N$. MW, 151. B.p. 219-20°, 110°/15 mm. D^{15} 1.0091.

Phenyl ester: $C_{12}H_9O_2N$. MW, 199. M.p. 70°.

Chloride: C_6H_4ONCl . MW, 141.5. M.p. 15-16°.

Amide: $C_6H_6ON_2$. MW, 122. M.p. 155.5-156°.

Anhydride: $C_{12}H_8O_3N_2$. MW, 228. M.p. 103-4° (302° decomp., sealed tube).

Nitrile: see 4-Cyanopyridine.

Späth, Spitzer, *Ber.*, 1926, **59**, 1477.

Meyer, Graf, *Ber.*, 1928, **61**, 2206.

Graf, *Biochem. Z.*, 1930, **229**, 164.

Meyer, *Rec. trav. chim.*, 1925, **44**, 325.

Pinner, *Ber.*, 1900, **33**, 1227.

See also Hoppe-Seyler, *Z. physiol. Chem.*, 1933, **222**, 105.

Isonipectic Acid.

See Hexahydroisonicotinic Acid.

Isonitrosoacetic Acid (Oximinoacetic acid, glyoxylic acid oxime, glyoximic acid)



$C_2H_3O_3N$ MW, 89

Two forms:

(i) Needles from EtOH, prisms from Et_2O -pet. ether. M.p. 143-4° (138°), part sublimes and decomp. Heat to 180° \rightarrow HCN + CO_2 + H_2O . Very sol. H_2O , EtOH. Mod. sol. Et_2O . Insol. C_6H_6 , $CHCl_3$. Sol. alkalis \rightarrow yellow col. $FeCl_3 \rightarrow$ red col. developing slowly. $k = 0.96 \times 10^{-3}$ at 25°.

Me ester: $C_3H_5O_3N$. MW, 103. Prisms from Et_2O -pet. ether. M.p. 55°. B.p. 100°/25 mm.

Et ester: $C_4H_7O_3N$. MW, 117. Needles from Et_2O -pet. ether. M.p. 35°. B.p. 110-15°/15 mm.

(ii) M.p. 100° (sinters). $\text{FeCl}_3 \rightarrow$ instant red col.

Aymaretto, *Gazz. chim. ital.*, 1927, **57**, 650.

Houben, Kauffmann, *Ber.*, 1913, **46**, 2825.

Wieland, *Ber.*, 1910, **43**, 3363 (footnote 2).

Inglis, Knight, *J. Chem. Soc.*, 1908, **93**, 1596.

Bouveault, Wahl, *Bull. soc. chim.*, 1904, **31**, 677.

Isonitrosoacetoacetic Ester.

See under Diketobutyric Acid.

Isonitrosoacetone (Pyruvaldoxime, methylglyoxal oxime)



$\text{C}_3\text{H}_5\text{O}_2\text{N}$ MW, 87

M.p. 69°. Sol. H_2O , Et_2O . Spar. sol. C_6H_6 , CHCl_3 , CCl_4 . D_{20}^{25} 1.07437. Sublimes. Volatile in steam.

Oxime: see Methylglyoxime.

Hydrazone: m.p. 91°.

Semicarbazone: m.p. 218° decomp.

Me ether: $\text{C}_4\text{H}_7\text{O}_2\text{N}$. MW, 101. B.p. 115–16° decomp. Oxime: m.p. 73°.

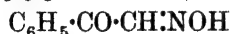
Et ether: $\text{C}_5\text{H}_9\text{O}_2\text{N}$. MW, 115. B.p. 130°.

Cambi, *Atti accad. Lincei*, 1913, **22**, i, 379.

Rupe, Kessler, *Ber.*, 1909, **42**, 4718.

See also Taylor, Ewbank, *J. Chem. Soc.*, 1926, 2822.

Isonitrosoacetophenone (Benzoylformoxime, phenylglyoxal oxime)



$\text{C}_8\text{H}_7\text{O}_2\text{N}$ MW, 161

Plates from CHCl_3 . M.p. 129° (126–8°). Sol. hot H_2O .

Oxime: (a) m.p. 168°. (b) M.p. 180°.

Hydrazone: m.p. 110°. Benzylidene deriv.: m.p. 154°. Diacetyl deriv.: m.p. 166°.

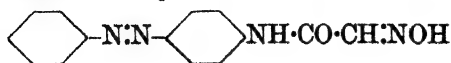
Semicarbazone: m.p. 107°, anhyd. 166°.

Cambi, *Atti accad. Lincei*, 1913, **22**, i, 380.

Dey, *J. Chem. Soc.*, 1914, **105**, 1043.

See also Gastaldi, *Gazz. chim. ital.*, 1921, **51**, i, 233.

Isonitrosoacetylaminobenzene



$\text{C}_{14}\text{H}_{12}\text{O}_2\text{N}_4$ MW, 268

Orange needles from EtOH . Aq. M.p. 214°. Turbidity indicator.

Naegeli, Tyabji, *Helv. Chim. Acta*, 1932, **15**, 406, 778.

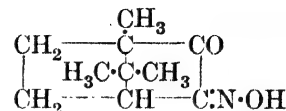
Isonitrosoadipic Acid.

See under 1-Ketoadipic Acid.

Isonitrosobarbituric Acid.

See Violuric Acid.

Isonitrosocamphor (Camphorquinone-3-oxime)



$\text{C}_{10}\text{H}_{15}\text{O}_2\text{N}$ MW, 181

(1) *Syn*, (β -). Yellow cryst. M.p. 114–15° (rapid heat.). $[\alpha]_D^{16} + 173.4^\circ$.

(2) *Anti*, (α -). Cryst. from ligroin- C_6H_6 . M.p. 153°.

Benzoyl deriv.: m.p. 105–6°.

m-Nitrobenzoyl deriv.: (a) m.p. 152°. (b) M.p. 136–7°.

(3) *As usually prepared*. Prisms from MeOH . Aq. M.p. 151–2°. $[\alpha]_D^{24} + 200^\circ$ in EtOH .

Phenyl ether: $\text{C}_{16}\text{H}_{19}\text{O}_2\text{N}$. MW, 257. M.p. 78°. $[\alpha]_D + 92^\circ$.

Meisenheimer, Theilacker, *Ann.*, 1932, **493**, 33.

Takeucki, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1933, **23**, 291.

Isonitrosocynoacetic Acid.

See under Isonitrosomalonic Acid.

Isonitrosodiethyl Ketone.

See under Acetylpropionyl.

Isonitrosoethyl n-amyl Ketone.

See under Acetylcaproyl.

Isonitrosoethyl isobutyl Ketone.

See under Acetylisovaleryl.

Isonitrosoethyl isopropyl Ketone.

See under Acetylisobutyryl.

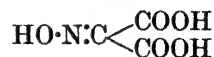
Isonitrosoisoamylacetone.

See under Acetylisocaproyl.

Isonitrosoisocaproic Acid.

See under 1-Ketoisocaproic Acid.

Isonitrosomalonic Acid (Mesoxalic acid oxime, oximinomalonic acid)



$\text{C}_3\text{H}_3\text{O}_5\text{N}$ MW, 133

Needles. M.p. 139° decomp. (decomp. at 131°).

Di-Me ester: $\text{C}_5\text{H}_7\text{O}_5\text{N}$. MW, 161. M.p. 64° (67°). B.p. 168°/16 mm. (165–9°/45 mm.).

Di-Et ester: $\text{C}_7\text{H}_{11}\text{O}_5\text{N}$. MW, 189. B.p. 172°/12 mm. Acetyl deriv.: b.p. 165°/15 mm.

Et ester-nitrile: $\text{C}_5\text{H}_6\text{O}_3\text{N}_2$. MW, 142. M.p. 133°. Me ether: $\text{C}_6\text{H}_8\text{O}_3\text{N}_2$. MW, 156. B.p.

111–12°/17 mm. *Et ether*: $C_7H_{10}O_3N_2$. MW, 170. B.p. 125–7°/23 mm.

Propyl ester-nitrile: $C_6H_8O_3N_2$. MW, 156. M.p. 106–7°.

Monoamide: $C_3H_4O_4N_2$. MW, 132. M.p. 137° decomp. *Me ether*: $C_4H_6O_4N_2$. MW, 146. M.p. 137–8° decomp.

Diamide: $C_3H_5O_3N_3$. MW, 131. M.p. 170–2° (187° decomp.). *Me ether*: $C_4H_7O_3N_3$. MW, 145. M.p. 143·5–144·5°. *Et ester*: $C_5H_9O_3N_3$. MW, 159. M.p. 150–1°. *Acetyl deriv.*: m.p. 190° decomp.

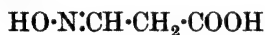
Nitrile: isonitrosocynoacetic acid. $C_3H_5O_3N_2$. MW, 114. M.p. 103° decomp. (anhyd. 129° decomp.). *Amide*: $C_3H_5O_2N_3$. MW, 113. M.p. anhyd. 184°.

Me ether: $C_4H_5O_5N$. MW, 147. M.p. 90–1°.

Wieland, Baumann, *Ann.*, 1912, 392, 207.
Cerchez, Colesiu, *Compt. rend.*, 1932, 194, 1954.

Cerchez, *Bull. soc. chim.*, 1930, 47, 1279.
See also Ulpiani, *Gazz. chim. ital.*, 1916, 46, i, 20.

Isonitrosopropionic Acid (*Oximinopropionic acid, formylacetic acid oxime, malonaldehydic acid oxime*)



$C_3H_5O_3N$ MW, 103

Syn.: *acetyl deriv.*, m.p. 145°.

Anti: m.p. 117–18° (114°).

Rinkes, *Rec. trav. chim.*, 1927, 46, 273.

v. Pechmann, *Ann.*, 1891, 264, 285.

Isonitrosopropiophenone.

See under Acetylbenzoyl.

Isonoragathic Acid

$C_{19}H_{30}O_2$ MW, 290

Plates from MeOH.Aq. M.p. 177–8°. B.p. 181–4°/0·2 mm. $[\alpha]_D + 2\cdot13^\circ$ in EtOH.

Me ester: $C_{20}H_{32}O_2$. MW, 304. M.p. 98–9°. $[\alpha]_D + 2\cdot65^\circ$ in EtOH. $D_4^{102} 0\cdot985$. $n_D^{102} 1\cdot4864$.

Ruzicka, Hosking, *Helv. Chim. Acta*, 1930, 13, 1402.

Isonorbixin

$C_{24}H_{28}O_4$ MW, 380

Leaflets with bluish-red cast. Does not melt below 300°.

Me ester: $C_{25}H_{30}O_4$. MW, 394. M.p. 217°.

Di-Me ester: $C_{26}H_{32}O_4$. MW, 408. M.p. 200–1°.

Karrer, Helfenstein, Widmer, Itallie, *Helv. Chim. Acta*, 1929, 12, 744, 752.

Isonorlupinene

$C_9H_{15}N$ MW, 137

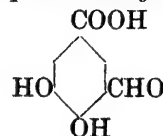
B.p. 43–5°/1 mm.

Picrate: m.p. 147°.

Picrolonate: m.p. 189°.

Clemon, Ramage, Raper, *J. Chem. Soc.*, 1932, 2968.

Isonoropianic Acid (4 : 5-Dihydroxy-3-aldehydobenzoic acid, 5-formylprotocatechuic acid, 4 : 5-dihydroxyisophthalaldehydic acid)



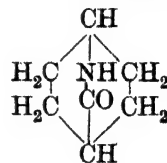
$C_8H_6O_5$ MW, 182

Yellow needles from H_2O . M.p. 240° decomp. Sol. hot H_2O , EtOH, Et_2O . Mod. sol. cold H_2O . Sol. alkalis \rightarrow yellow col. which turns reddish on warming. $FeCl_3 \rightarrow$ dark green col. changing to violet-red on adding Na_2CO_3 .

4 : 5-Di-Me ether: see Iso-opianic Acid.

Tiemann, Mendelsohn, *Ber.*, 1877, 10, 400.

Isonortropinone (Hexahydro-p-aminobenzo-lactam)



$C_7H_{11}ON$ MW, 125

Needles from ligroin. M.p. 191–2°. Sol. H_2O , ord. org. solvents. Spar. sol. pet. ether, ligroin.

Houben, Pfau, *Ber.*, 1916, 49, 2297.

Iso-octane.

See 2-Methylheptane.

Iso-octane-3 : 6-dicarboxylic Acid.

See 1-Methyl-4-isopropyladipic Acid.

Iso-octene.

See 6-Methyl-1-heptene.

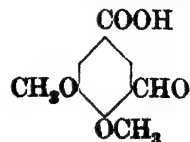
Iso-octenic Acid.

See Methylheptenic Acid.

Iso-octyl Alcohol.

See 6-Methyl-n-heptyl Alcohol.

Iso-opianic Acid (4 : 5-Dimethoxy-3-aldehydobenzoic acid, 5-formylveratric acid)



$C_{10}H_{10}O_5$ MW, 210

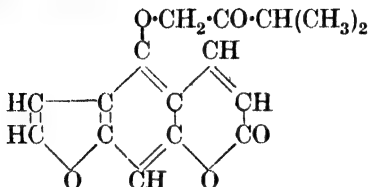
Slender needles from H_2O . M.p. 210–11°.

Me ester: $C_{11}H_{12}O_5$. MW, 224. Needles from H_2O . M.p. 98–9°.

Nitrile: $C_{10}H_9O_3N$. MW, 191. Needles from C_6H_6 . M.p. 135°.

Chakravarti, Perkin, *J. Chem. Soc.*, 1929, 193.

Iso-oxypeucedanane



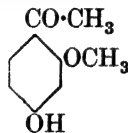
$C_{16}H_{14}O_5$ MW, 286

Isomer of the fish-poison oxypeucedanane from *Imperatoria ostruthium*. Cryst. from Et_2O . M.p. 146°.

Oxime: cryst. from $EtOH.Aq$. M.p. 186°.

Späth, Klager, *Ber.*, 1933, 66, 914, 921.

Isopæonol (*Resacetophenone 2-methyl ether, 4-hydroxy-2-methoxyacetophenone*)



$C_9H_{10}O_3$ MW, 166

Needles from H_2O . M.p. 138° (130°).

Hoesch, *Ber.*, 1915, 48, 1126.

Mauthner, *Chem. Abstracts*, 1934, 28, 3392.

Isopalmitic Acid (*14-Methylpentadecylic acid*)

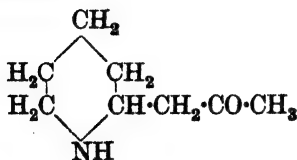


$C_{16}H_{32}O_2$ MW, 256

Cryst. from $AcOEt$. M.p. 61.8–62.4°.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, 55, 3370.

Isopelletierine (*2-Acetonypiperidine, 2-piperidylacetone*)



$C_8H_{16}ON$ MW, 141

B.p. 91–2°/14 mm. D_4^{20} 0.9602 (0.9624). n_D^{20} 1.46831 (1.46687).

B,HCl: m.p. 143°.

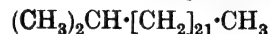
B,HBr: m.p. 135°.

Picrate: m.p. 147–9°.

N-Me: alkaloid occurring in *Punica granatum*, Linn. $C_9H_{17}ON$. MW, 155. B.p. 96–8°/13 mm. D_4^{20} 0.9478. n_D^{20} 1.46737. *B,HCl*: m.p. 157–8° (155–6°). *Picrate*: m.p. 154–5°. *Methiodide*: m.p. 156° (150–1°). *Semicarbazone*: m.p. 167–8°. *B,HBr*: m.p. 151–2°.

Hess, Littmann, *Ann.*, 1932, 494, 7.

Isopentacosane (2-Methyltetracosane)



$C_{25}H_{52}$ MW, 352

M.p. 56°.

Levene, Taylor, *J. Biol. Chem.*, 1922, 52, 227.

Isopentacosanic Acid



$C_{25}H_{50}O_2$ MW, 382

M.p. 78.5°.

Et ester: $C_{27}H_{54}O_2$. MW, 410. M.p. 57°.

See previous reference.

Isopentacosyl Alcohol (ω -Methyltetracosanol-1)



$C_{25}H_{52}O$ MW, 368

M.p. 75°.

See previous reference.

Isopentacosyl iodide

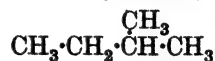


$C_{25}H_{51}I$ MW, 478

M.p. 51.5°.

See previous reference.

Isopentane (2-Methylbutane)



C_5H_{12} MW, 72

M.p. –160.0° (–159.6°). B.p. 30–30.2°/747 mm. (27.95°). D_4^{20} 0.62007 (0.6194). n_D^{15} 1.35796.

Timmermans, Martin, *J. chim. phys.*, 1926, 23, 733.

Chavanne, Simon, *Compt. rend.*, 1919, 168, 1324.

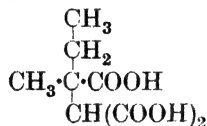
Chablay, *Ann. chim.*, 1914, 1, 497.

Isopentane-1 : 1-dicarboxylic Acid.

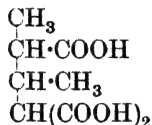
sec.-Butylmalonic Acid, *q.v.*

Isopentane-1 : 2-dicarboxylic Acid.

See 1-Methyl-1-ethylsuccinic Acid.

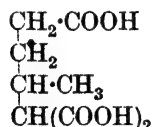
Isopentane-1 : 4-dicarboxylic Acid**Isopentane-1 : 4-dicarboxylic Acid.***See* 2-Methyladipic Acid.**Isopentane-3 : 3-dicarboxylic Acid.***See* Methylisopropylmalonic Acid.**Isopentane-3 : 4-dicarboxylic Acid.***See* Isopropylsuccinic Acid.**Isopentane-4 : 4-dicarboxylic Acid.***See* Isobutylmalonic Acid.**Isopentane-1 : 1 : 2-tricarboxylic Acid (2-Methylbutane-1 : 1 : 2-tricarboxylic acid)** $\text{C}_8\text{H}_{12}\text{O}_6$ MW, 204

1-Mono-Et ester : $\text{C}_{10}\text{H}_{16}\text{O}_6$. MW, 232. 1 : 2-Di-nitrile : $\text{C}_{10}\text{H}_{14}\text{O}_2\text{N}_2$. MW, 194. B.p. 164–6°/19.5 mm.

Inglis, *J. Chem. Soc.*, 1911, 99, 544.**Isopentane-1 : 1 : 3-tricarboxylic Acid (2-Methylbutane-1 : 1 : 3-tricarboxylic acid)** $\text{C}_8\text{H}_{12}\text{O}_6$ MW, 204

Decomp. at 145°.

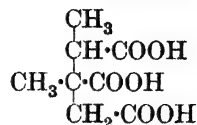
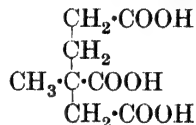
1-Mono-nitrile : $\text{C}_8\text{H}_{11}\text{O}_4\text{N}$. MW, 185. Di-Et ester : $\text{C}_{12}\text{H}_{19}\text{O}_4\text{N}$. MW, 241. B.p. 176°/25 mm., 172°/17 mm.

Blaise, *Compt. rend.*, 1903, 136, 243.**Isopentane 1 : 1 : 4-tricarboxylic Acid (2-Methylbutane-1 : 1 : 4-tricarboxylic acid)** $\text{C}_8\text{H}_{12}\text{O}_6$ MW, 204

Plates from H_2O . M.p. 127–8° decomp. Heat at 200° \longrightarrow 2-methyladipic acid.

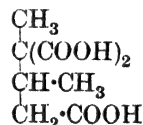
Tri-Et ester : $\text{C}_{14}\text{H}_{24}\text{O}_6$. MW, 288. B.p. about 135°/0.4 mm.

1-Mono-nitrile : $\text{C}_8\text{H}_{11}\text{O}_4\text{N}$. MW, 185. Di-Et ester : $\text{C}_{12}\text{H}_{19}\text{O}_4\text{N}$. MW, 241. B.p. 175–85°/20 mm.

Noyes, Cox, *J. Am. Chem. Soc.*, 1903, 25, 1095.Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, 7, 249.**444 Isopentane-1 : 3 : 4-tricarboxylic Acid****Isopentane-1 : 2 : 3-tricarboxylic Acid (2-Methylbutane-1 : 2 : 3-tricarboxylic acid)** $\text{C}_8\text{H}_{12}\text{O}_6$ MW, 204Prisms from H_2O . M.p. 196–8°.Michael, *Ber.*, 1900, 33, 3764.**Isopentane-1 : 2 : 4-tricarboxylic Acid (2-Methylbutane-1 : 2 : 4-tricarboxylic acid)** $\text{C}_8\text{H}_{12}\text{O}_6$ MW, 204

Tri-Et ester : $\text{C}_{14}\text{H}_{24}\text{O}_6$. MW, 288. B.p. 175–8°/12 mm.

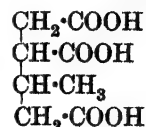
2-Nitrile : $\text{C}_8\text{H}_{11}\text{O}_4\text{N}$. MW, 185. Di-Et ester : $\text{C}_{12}\text{H}_{19}\text{O}_4\text{N}$. MW, 241. B.p. 179–80°/13 mm.

Ruzicka, *Ber.*, 1917, 50, 1367.**Isopentane-1 : 3 : 3-tricarboxylic Acid (2-Methylbutane-1 : 3 : 3-tricarboxylic acid)** $\text{C}_8\text{H}_{12}\text{O}_6$ MW, 204

Needles from dil. HCl. M.p. 165° decomp.

Tri-Et ester : $\text{C}_{14}\text{H}_{24}\text{O}_6$. MW, 288. Oil. B.p. 160.5–161°/10 mm.

3-Mono-nitrile : $\text{C}_8\text{H}_{11}\text{O}_4\text{N}$. MW, 185. Needles from Et_2O -ligroin. M.p. 132–4°. Di-Et ester : $\text{C}_{12}\text{H}_{19}\text{O}_4\text{N}$. MW, 241. Oil. B.p. 185°/20 mm.

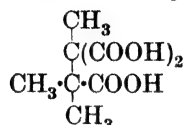
Thorpe, Young, *J. Chem. Soc.*, 1903, 83, 355.Michael, *Ber.*, 1900, 33, 3747.**Isopentane-1 : 3 : 4-tricarboxylic Acid (2-Methylbutane-1 : 3 : 4-tricarboxylic acid)** $\text{C}_8\text{H}_{12}\text{O}_6$ MW, 204M.p. 154°. Sol. H_2O .

Tri-Et ester : $C_{14}H_{24}O_6$. MW, 288. B.p. 180–3°/20 mm.

Hope, Perkin, *J. Chem. Soc.*, 1911, **99**, 767.

Thorpe, *J. Chem. Soc.*, 1919, **115**, 684.

Isopentane-2 : 3 : 3-tricarboxylic Acid (2-Methylbutane-2 : 3 : 3-tricarboxylic acid)



$C_8H_{12}O_6$ MW, 204

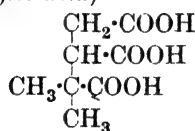
3-Et ester : $C_{10}H_{16}O_6$. MW, 232. *Dinitrile* : $C_{10}H_{14}O_2N_2$. MW, 194. Oil. B.p. 150°/20 mm.

3-Nitrile : $C_8H_{11}O_4N$. MW, 185. *Di-Et ester* : $C_{12}H_{19}O_4N$. MW, 241. B.p. 203–8°/123 mm., 157–8°/20 mm. D_4^{20} 1.0628. n_D 1.4413.

Bone, Sprankling, *J. Chem. Soc.*, 1899, **75**, 855.

Higson, Thorpe, *J. Chem. Soc.*, 1906, **89**, 1466.

Isopentane-2 : 3 : 4-tricarboxylic Acid (2-Methylbutane-2 : 3 : 4-tricarboxylic acid, 1 : 1-dimethyltricarballic acid)



$C_8H_{12}O_6$ MW, 204

Prisms from H_2O . M.p. 157–8° (143°). Sol. H_2O , EtOH, Et₂O, Me₂CO, AcOH. Spar. sol. $CHCl_3$. $k = 3.18 \times 10^{-4}$ at 25°. Heat → anhydride.

Tri-Me ester : $C_{11}H_{18}O_6$. MW, 246. Oil. B.p. 170–4°/33 mm. D_4^{20} 1.1403. n_D 1.4417.

Tri-Et ester : $C_{14}H_{24}O_6$. MW, 288. B.p. 172–4°/19 mm.

Anhydride : prisms from AcOEt. M.p. 145–6° (139–41°). B.p. about 225°.

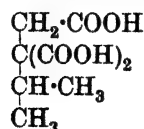
Haller, Blanc, *Compt. rend.*, 1900, **131**, 21.

Bone, Sprankling, *J. Chem. Soc.*, 1902, **81**, 44.

Gardner, Cockburn, *J. Chem. Soc.*, 1898, **73**, 710.

Tiemann, Semmler, *Ber.*, 1895, **28**, 1349.

Isopentane-3 : 3 : 4-tricarboxylic Acid (2-Methylbutane-3 : 3 : 4-tricarboxylic acid)



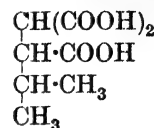
$C_8H_{12}O_6$

MW, 204 $C_8H_6O_2$

Cryst. M.p. 145° decomp.

Hjelt, *Ber.*, 1883, **16**, 2622.

Isopentane-3 : 4 : 4-tricarboxylic Acid (2-Methylbutane-3 : 4 : 4-tricarboxylic acid)



$C_8H_{12}O_6$ MW, 204

Cryst. from H_2O . M.p. 160° decomp. Sol. H_2O , EtOH, Et₂O. Less sol. $CHCl_3$, pet. ether.

Tri-Et ester : $C_{14}H_{24}O_6$. MW, 288. B.p. 276–8°, 180–2°/37 mm. Bitter taste.

4-Mono-nitrile : $C_8H_{11}O_4N$. MW, 185. *Di-Et ester* : $C_{12}H_{19}O_4N$. MW, 241. B.p. 165–7°/19–21 mm. D_4^{20} 1.0620. n_D 1.4413.

Schleicher, *Ann.*, 1892, **267**, 121.

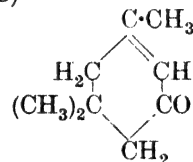
Bentley, Perkin, Thorpe, *J. Chem. Soc.*, 1896, **69**, 273.

Bone, Sprankling, *J. Chem. Soc.*, 1900, **77**, 658.

Isopentene.

See Methylbutylene.

Isophorone (Isacetophorone, 1 : 5 : 5-trimethylcyclohexenone-3)



$C_9H_{14}O$ MW, 138

B.p. 214°/754 mm., 109°/32 mm., 102.5–103°/24 mm., 99°/18 mm., 98°/17 mm., 100–2°/15 mm., 89°/10 mm. Insol. H_2O . D_4^{20} 0.9255. n_D^{25} 1.4766. Heat of comb. \bar{C}_v 1259.2 Cal.

Oxime : m.p. 75–6° (78–80°). B.p. 153°/40 mm., 134°/16 mm.

Semicarbazone : m.p. 190–1°.

Treibs, *Ber.*, 1933, **66**, 1491.

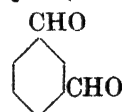
Wolff, *Ann.*, 1902, **322**, 379 (*Bibl.*).

Cornubert, Borrel, *Bull. soc. chim.*, 1929, **45**, 1158.

M.L.B., D.R.P., 134,982, (*Chem. Zentr.*, 1902, II, 1164).

See also Delacre, *Bull. soc. chim.*, 1918, **23**, 219.

Isophthalaldehyde (1 : 3-Dialdehydobenzene)



MW, 134

Needles. M.p. 89–90°. Sol. most ord. org. solvents except Et₂O and ligroin. Spar. sol. H₂O. Volatile in steam.

Dioxime : m.p. 180°. *Di-Me ether* : m.p. 77°. *Di-Et ether* : m.p. 165°.

Di-phenylhydrazone : m.p. 242–4°.

Guha, Hyi, *J. Indian Chem. Soc.*, 1930, 7, 940.

Rosenmund, *Zetsche, Ber.*, 1921, 54, 2890.

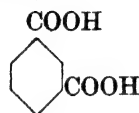
Isophthalaldehydic Acid.

See *m*-Aldehydobenzoic Acid.

Isophthalamic Acid.

See under Isophthalic Acid.

Isophthalic Acid (*Benzene-m-dicarboxylic acid, m-phthalic acid*)



C₈H₆O₄

MW, 166

Occurs in rhizome of *Iris versicolor*, Linn. Needles from hot H₂O or EtOH. M.p. 345–7°. Sol. AcOH. Mod. sol. EtOH. Spar. sol. H₂O. Insol. C₆H₆, ligroin. *k* (first) = 2.9 × 10⁻⁴ at 25°; (second) = 2.5 × 10⁻⁵ at 18°. Heat of comb. C_p 769.1 (768.8) Cal., C_p 768.8 Cal.

Mono-Me ester : C₉H₈O₄. MW, 180. M.p. 193°. *k* = 1.28 × 10⁻⁴ at 25°. *Amide* : C₉H₈O₃N. MW, 179. M.p. 148.5°.

Di-Me ester : C₁₀H₁₀O₄. MW, 194. M.p. 68° (64–5°). B.p. 124°/12 mm.

Mono-Et ester : C₁₀H₁₀O₄. MW, 194. M.p. 115–17°.

Di-Et ester : C₁₂H₁₄O₄. MW, 222. M.p. 11.5°. B.p. 285°, 170–170.5°/2.4 mm. *D*₄¹⁷ 1.1239. *n*_D¹⁷ 1.508.

Di-phenyl ester : C₂₀H₁₄O₄. MW, 318. M.p. 120° (191°).

Dichloride : C₈H₄O₃Cl₂. MW, 203. M.p. 43–4°. B.p. 276°. *D*₄¹⁷ 1.3880. *n*_D¹⁷ 1.570.

Monoamide : isophthalamide. C₈H₇O₃N. MW, 165. M.p. 280°.

Diamide : C₈H₆O₂N₂. MW, 164. M.p. 280°.

Mononitrile : see *m*-Cyanobenzoic Acid.

Di-nitrile : *m*-dicyanobenzene. C₆H₄N₂. MW, 128. M.p. 161.5–2°.

Di-hydrazide : m.p. 220°.

Baeyer, Villiger, *Ann.*, 1893, 276, 258.

Perkin, *J. Chem. Soc.*, 1896, 69, 1177.

Naegeli, Münzel, D.R.P., 554,700, (*Chem. Abstracts*, 1932, 26, 5970).

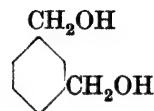
Smith, *J. Am. Chem. Soc.*, 1921, 43, 1920.

Wohl, *Ber.*, 1910, 43, 3477.

Isophthalophenone.

See *m*-Dibenzoylbenzene.

Isophthalyl Alcohol (*m*-Benzenedicarbinol, α : α'-*m*-xylenediol, ωω'-dihydroxy-*m*-xylene, 1 : 3-di-[hydroxymethyl]-benzene, *m*-hydroxymethylbenzyl alcohol)



C₈H₁₀O₂

MW, 138

Needles from C₆H₆. M.p. 57° (46–7°). B.p. 154–9°/13 mm. Sol. H₂O, Et₂O.

Di-Et ether : C₁₂H₁₈O₂. MW, 194. B.p. 246–7°/712 mm.

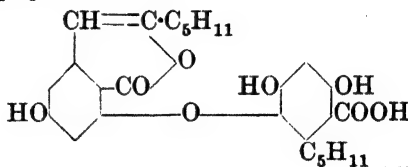
Mettler, *Ber.*, 1906, 39, 2940.

Gough, Thorpe, *J. Chem. Soc.*, 1919, 115, 1162.

Isophyllodulcin.

See under Phyllodulcin.

Isophysodic Acid



C₂₆H₃₀O₈

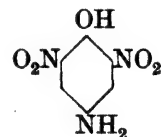
MW, 470

Prisms from 90% AcOH. M.p. 191–2°. FeCl₃ on EtOH sol. → violet col.

Me ester : C₂₇H₃₂O₈. MW, 484. M.p. 197°. *Tri-Me ether* : C₃₀H₃₈O₈. MW, 526. M.p. 125°.

Asahina, Nogami, *Ber.*, 1934, 67, 809.

Isopicramic Acid (2 : 6-Dinitro-4-amino-phenol)



C₆H₅O₅N₃

MW, 199

Yellowish-brown needles from H₂O. M.p. 170°. Sol. EtOH. Spar. sol. H₂O, C₆H₆.

Me ether : 2 : 6-dinitro-*p*-anisidine. C₇H₇O₅N₃. MW, 213. M.p. 212°. *N*-Acetyl : m.p. 157°.

Et ether : 2 : 6-dinitro-*p*-phenetidine. C₈H₉O₅N₃. MW, 227. M.p. 172°. *N*-Acetyl : m.p. 148°.

N-Me : C₇H₇O₅N₃. MW, 213. M.p. 153–4°. *N*-Acetyl : m.p. 142–3°.

N-Acetyl : m.p. 182°.

N-Benzoyl : m.p. 263° (250°).

N-Di-Me : C₈H₉O₅N₃. MW, 227. M.p.

182°. *Me ether*: $C_9H_{11}O_5N_3$. MW, 241. M.p. 150°.

N-Me: *N-Et*: $C_9H_{11}O_5N_3$. MW, 241. M.p. 104–5°. *Et ether*: $C_{11}H_{15}O_5N_3$. MW, 269. M.p. 67–8°.

N-Benzyl: $C_{13}H_{17}O_5N_3$. MW, 289. Violet prisms. M.p. 155–6°.

N-Dibenzyl: $C_{20}H_{17}O_5N_3$. MW, 379. M.p. 112–14°. *Me ether*: $C_{21}H_{19}O_5N_3$. MW, 393. M.p. 97–8°.

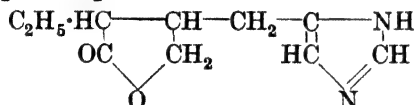
N-Me: *N-Benzyl*: $C_{14}H_{13}O_5N_3$. MW, 303. M.p. 111–12°.

N-Et: *N-Benzyl*: $C_{15}H_{15}O_5N_3$. MW, 317. M.p. 96–7°. *Et ether*: $C_{17}H_{19}O_5N_3$. MW, 345. M.p. 129–30°.

Egerer, *J. Biol. Chem.*, 1918, **35**, 565.

Meldola, Hollely, *J. Chem. Soc.*, 1914, **105**, 2073.

Isopilocarpidine



$C_{10}H_{14}O_2N_2$ MW, 194

Stereoisomer of pilocarpidine. Oil.

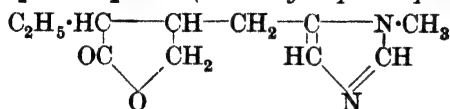
B.HNO₃: m.p. 109–11° (112–13°).

Aurichloride: m.p. 159°.

N-Me: see Isopilocarpine.

Preobrashenski, Wompe, Preobrashenski, *Ber.*, 1933, **66**, 1191.

Isopilocarpine (N-Methylisopilocarpidine)



$C_{11}H_{16}O_2N_2$ MW, 208

Alkaloid from leaves of *Pilocarpus pennatifolius*, Lem., and *P. jaborandi*, Holmes. Oil. B.p. 261°/10 mm.

B.HCl, $\frac{1}{2}H_2O$: m.p. 127°, anhyd. 159°. $[\alpha]_D + 38.8^\circ$.

B.HBr: m.p. 147°. $[\alpha]_D + 32.8^\circ$.

B.HNO₃: m.p. 159°. $[\alpha]_D + 35.68^\circ$.

B.HAuCl₄: m.p. 158–9°.

B₂H₂PtCl₆: m.p. 226–7° decomp.

Picrate: m.p. 161°.

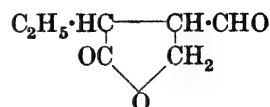
Methiodide: m.p. 114°.

Burtles, Pyman, Roylance, *J. Chem. Soc.*, 1925, 581.

Jowett, *J. Chem. Soc.*, 1905, **87**, 794; 1900, **77**, 483.

Preobrashenski, Wompe, Preobrashenski, *Ber.*, 1933, **66**, 1187.

Isopilopaldehyde (3-Ethyl-4-aldehydo-2-ketotetrahydrofuran, 3-ethylparaconic aldehyde)



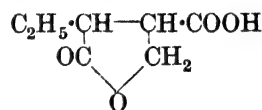
$C_7H_{10}O_3$ MW, 142

dl.

B.p. 90°/0.05 mm.

Preobrashenski, Poljakowa, Preobrashenski, *Ber.*, 1934, **67**, 712.

Isopilopic Acid (3-Ethylparaconic acid, 2-keto-3-ethyltetrahydrofuran-4-carboxylic acid)



$C_7H_{10}O_4$ MW, 158

d. (Jowett's "Pilopic Acid").

M.p. 105–105.5°. $[\alpha]_D^{25} + 58.92^\circ$ in H_2O .

l.

M.p. 105–105.5°. $[\alpha]_D^{25} - 58.06^\circ$ in H_2O .

dl.

M.p. 87.5–88°. B.p. 184–5°/7.5 mm. Sol. EtOH, AcOH, C_6H_6 , Me_2CO , AcOEt, hot H_2O . Insol. pet. ether.

Et ester: $C_9H_{14}O_4$. MW, 186. B.p. 276–276.5°/751 mm. D_4^{20} 1.1085.

Chloride: $C_7H_9O_3Cl$. MW, 176.5. B.p. 90.2°/0.05 mm.

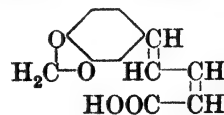
Tschitschibabin, Preobrashenski, *Ber.*, 1930, **63**, 467.

Preobrashenski, Poljakowa, Preobrashenski, *Ber.*, 1934, **67**, 712.

Isopinene.

See under α -Fenchene.

Isopiperic Acid (4-[3 : 4-Methylenedioxyphenyl]-vinylacrylic acid, 4-[3 : 4-methylenedioxyphenyl]-1 : 3-butadiene-1-carboxylic acid)



$C_{12}H_{10}O_4$ MW, 218

Cryst. from C_6H_6 . M.p. 155° (145°).

Lohaus, *J. prakt. Chem.*, 1928, **119**, 254.

Isopral.

See 1 : 1 : 1-Trichloroisopropyl Alcohol.

Isoprene (2-Methylbutadiene-1:3, 2-methylethylene, 2-methyldivinyl)



C_5H_8 MW, 68

F.p. about -120° . B.p. $34.5\text{--}35^\circ/762$ mm. D_4^{20} 0.6806. n_D^{20} 1.4194. Polymerizes \rightarrow "synthetic" rubber. $\text{CrO}_3 \rightarrow \text{CO}_2 + \text{H}\cdot\text{COOH} + \text{CH}_3\cdot\text{COOH}$. Condenses with terpenes in presence of AlCl_3 .

Di-hydrobromide: see 2:4-Dibromoisopentane.

Kondakov, *Caoutchouc et gutta-percha*, 1921, 18, 1097 (Review).

Dubosc, *Revue des produits chimiques*, 1921, 24, 273, 307, 371 (Review).

Sloin, *Revue générale de caoutchouc*, 1926, 13 (Review).

Waterman, Westen, *Rec. trav. chim.*, 1929, 54, 1084.

I.G., D.R.P., 565,160, (*Chem. Abstracts*, 1933, 27, 992).

Bogert, *Chem. Reviews*, 1932, 10, 265 (Review).

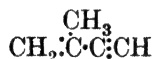
Jacobs, *Chem. Abstracts*, 1932, 26, 4731.

Jones, Williams, *J. Chem. Soc.*, 1934, 829.

Isoprene-1:4-dicarboxylic Acid.

See 2-Methylmuconic Acid.

Isopropenylacetylene (3-Methylbutenine, 3-methyvinylacetylene)



C_5H_6 MW, 66

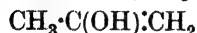
B.p. $32\text{--}32.5^\circ$. D_4^{11} 0.6801. n_D^{20} 1.4158.

Bayer, D.R.P., 290,558, (*Chem. Zentr.*, 1916, I, 644).

Scheibler, Fischer, *Ber.*, 1922, 55, 2903.

Favorski, Russian P., 31,015, (*Chem. Abstracts*, 1934, 28, 3425).

Isopropenyl Alcohol (2-Hydroxypropylene)



$\text{C}_3\text{H}_6\text{O}$ MW, 58

Me ether: 2-methoxypropylene. $\text{C}_4\text{H}_8\text{O}$. MW, 72. B.p. 38° .

Et ether: 2-ethoxypropylene. $\text{C}_5\text{H}_{10}\text{O}$. MW, 86. B.p. $62\text{--}3^\circ$. D^{20} 0.769.

Claisen, *Ber.*, 1898, 31, 1021.

Isopropenylbenzene.

See α -Methylstyrene.

Isopropenyl bromide (2-Bromopropylene)



$\text{C}_3\text{H}_5\text{Br}$ MW, 121

M.p. -126° . B.p. $48\text{--}35^\circ$. $D_4^{18.75}$ 1.3965. $n_D^{15.75}$ 1.44665. Alc. KOH \rightarrow allylene. Refrigerating agent.

Reboul, *Ann. chim.*, 1878, 14, 475.

See also Wyss, F.P., 751,969, (*Chem. Abstracts*, 1934, 28, 783).

Isopropenyl chloride (2-Chloropropylene)



$\text{C}_3\text{H}_5\text{Cl}$ MW, 76.5

M.p. -138.6° . B.p. $22\text{--}65^\circ$. n_D^{25} 1.404. Refrigerating agent.

Mailhe, *Bull. soc. chim.*, 1921, 29, 535.

Goudet, Schenker, *Helv. Chim. Acta*, 1927, 10, 132.

Timmermans, *Bull. soc. chim. Belg.*, 1927, 36, 502.

See also Wyss, F.P., 751,969, (*Chem. Abstracts*, 1934, 28, 783).

Isopropenyl iodide (2-Iodopropylene)



$\text{C}_3\text{H}_5\text{I}$ MW, 168

B.p. $93\text{--}103^\circ$ ($82^\circ/761.8$ mm.). $D^{16.4}$ 1.8028.

Ssamenow, *Z. Chem.*, 1865, 725.

Oppenheim, *ibid.*, 719.

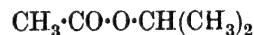
Isopropenylsuccinic Acid.

See 2-Methyl-1-butylene-3:4-dicarboxylic Acid.

Isopropylacetanilide.

See under Cumidine.

Isopropyl acetate



$\text{C}_5\text{H}_{10}\text{O}_2$ MW, 102

B.p. $90\text{--}3^\circ$ ($88\text{--}91^\circ/734.3$ mm.). D^0 0.9166.

Friedel, *Ann.*, 1862, 124, 327.

I.C.I., F.P., 694,726, (*Chem. Abstracts*, 1931, 25, 1843).

Buc, U.S.P., 1,808,155, (*ibid.*, 4285).

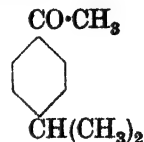
Isopropylacetone.

See Methyl isobutyl Ketone.

Isopropylacetonylcarbinol.

See 2-Methyl-3-hexanolone-5.

p-Isopropylacetophenone (p-Acetocumene, methyl p-cumyl ketone)



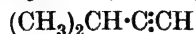
$\text{C}_{11}\text{H}_{14}\text{O}$ MW, 162

B.p. 252-4°/756 mm. D^{15}_D 0.9753.

Oxime: m.p. 70-1°.

Allen, *Organic Syntheses*, 1934, XIV, 1.

Isopropylacetylene (3-Methylbutyne-1)



C_5H_8

MW, 68

B.p. 28-9°/751 mm. D^0 0.6854. $\text{CrO}_3 \rightarrow$ acetone + acetic acid + isobutyric acid. $\text{H}_2\text{SO}_4 \rightarrow$ methyl isopropyl ketone.

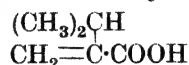
Flavitzki, Krylow, *Ber.*, 1878, 11, 1939.

Kutscherow, *Chem. Zentr.*, 1914, I, 754.

Badische, D.R.P., 268,102, (*Chem. Zentr.*, 1914, I, 308).

Perkin, Weizmann, E.P., 277/1913, (*Chem. Abstracts*, 1913, 7, 2095).

1-Isopropylacrylic Acid (3-Methyl-1-butylene-2-carboxylic acid, 1-methylene-isovaleric acid)



$\text{C}_6\text{H}_{10}\text{O}_2$

MW, 114

B.p. 192.5-193° (190-1°), 100°/19 mm. D^0 0.9854.

Et ester: $\text{C}_8\text{H}_{14}\text{O}_2$. MW, 142. B.p. 150° (153°).

Ssemenow, *Chem. Zentr.*, 1899, I, 1071.

Darzens, *Compt. rend.*, 1911, 152, 445.

2-Isopropylacrylic Acid (1-Isohexenic acid, isobutylidene-acetic acid, 3-methyl-1-butylene-1-carboxylic acid)



$\text{C}_6\text{H}_{10}\text{O}_2$

MW, 114

Present in hops. M.p. 33°. B.p. 217° (211-12°), 133°/50 mm., 115-16°/20 mm., 108°/10 mm. D^{21}_D 0.9529. n^{19}_D 1.4583. Very sol. ord. org. solvents. Br \rightarrow dibromide, m.p. 124-5°.

Et ester: $\text{C}_8\text{H}_{14}\text{O}_2$. MW, 142. B.p. 174°/757 mm., 76-7°/25 mm. (80°/14 mm.), 55-6°/9 mm. D^{21}_D 0.9048. n^{21}_D 1.4328.

Chloride: $\text{C}_6\text{H}_9\text{OCl}$. MW, 132.5. B.p. 58-9°/18 mm. D^{20}_D 1.018.

Amide: $\text{C}_6\text{H}_{11}\text{ON}$. MW, 113. Leaflets. M.p. 82-6°.

Nitrile: $\text{C}_6\text{H}_9\text{N}$. MW, 95. B.p. 154-5°/754 mm., 43-4°/11 mm. D^{16}_D 0.8268.

Anilide: needles from EtOH.Aq. M.p. 142° (128°).

Linstead, *J. Chem. Soc.*, 1929, 2505.

Wieland, Schneider, Martz, *Ber.*, 1925, 58, 102.

Auwers et al., *Ann.*, 1923, 432, 74.

Wöllmer, *Ber.*, 1916, 49, 780.

Det. of Org. Comp.—II.

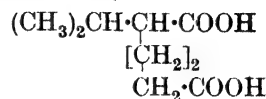
Franke, Kohn, *Monatsh.*, 1899, 20, 883.

Braun, *Monatsh.*, 1896, 17, 213.

Power, Tutin, Rogerson, *J. Chem. Soc.*, 1913, 103, 1279.

Howles, Thorpe, Udall, *J. Chem. Soc.*, 1900, 77, 942.

1-Isopropyladipic Acid (2-Methylhexane-3:6-dicarboxylic acid)



$\text{C}_9\text{H}_{16}\text{O}_4$

MW, 188

Prisms from C_6H_6 -pet. ether. M.p. 66-7° (63°). B.p. 222°/12 mm. Sol. H_2O , ord. org. solvents.

Di-Me ester: $\text{C}_{11}\text{H}_{20}\text{O}_4$. MW, 216. B.p. 132-3°/15 mm.

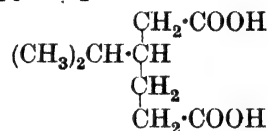
Mono-Et ester: $\text{C}_{11}\text{H}_{20}\text{O}_4$. MW, 216. B.p. 185°/15 mm.

Di-Et ester: $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. B.p. 148-9°/17 mm. D^{24}_D 0.9876.

Blanc, *Bull. soc. chim.*, 1905, 33, 907.

Bouveault, Locquin, *Bull. soc. chim.*, 1908, 3, 445.

2-Isopropyladipic Acid



$\text{C}_9\text{H}_{16}\text{O}_4$

MW, 188

d.

M.p. 72-4° (66°, 77-9°).

Na salt: $[\alpha]^{20}_D + 5.2^\circ$.

Di-Et ester: $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. B.p. 145-50°/23 mm. D^{20}_D 0.9776. $[\alpha]^{20}_D - 1.534^\circ$.

Dichloride: $\text{C}_9\text{H}_{14}\text{O}_2\text{Cl}_2$. MW, 225. B.p. 145-6°/15 mm.

Diamide: $\text{C}_9\text{H}_{18}\text{O}_2\text{N}_2$. MW, 186. M.p. 169-5°. $[\alpha]^{20}_D + 9.5^\circ$ in H_2O .

dl.

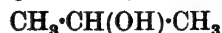
Cryst. from H_2O , m.p. 80°. Needles from Et_2O -pet. ether, m.p. 75° (85°, 86-8°). B.p. 215-18° (222°) 12 mm.

Wallach, Woodman, *Ann.*, 1918, 414, 287.

Braun, Werner, *Ber.*, 1929, 62, 1054.

Cahn, Penfold, Simonsen, *J. Chem. Soc.*, 1931, 1369.

Isopropyl Alcohol (Isopropanol, 2-hydroxypropane, dimethylcarbinol)



$\text{C}_3\text{H}_8\text{O}$

MW, 60

F.p. — 89.5°. B.p. 82.40°. D_4^{20} 0.7855. n_D^{20} 1.37757. Sol. H_2O . Forms azeotropic mixture with H_2O containing 12.1% H_2O . Heat of comb. C, 478.4 Cal., C_p 479.2 Cal.

Garlick, *Industrial Chemist*, 1927, 3, 392 (Review).

Brooks, *J. Am. Chem. Soc.*, 1934, 56, 1998.

Dalin, Gutuirya, *Chem. Abstracts*, 1934, 28, 7489.

Distillers Co., E.P., 408,982, (*Chem. Abstracts*, 1934, 28, 5468).

Timmermans, Delcourt, *J. chim. phys.*, 1934, 31, 105.

Merley, U.S.P., 1,933,505, (*Chem. Abstracts*, 1934, 28, 493).

Kirchhof, Stepanow, *Chem. Zentr.*, 1932, II, 1609.

Gilson, *J. Am. Chem. Soc.*, 1932, 54, 1445.

Brooks, *Chem. Reviews*, 1926, 2, 382 (Review).

Isopropylallylacetone.

See 7-Methyl-1-octenone-5.

3-Isopropylallyl Alcohol.

See 4-Methyl-2-pentenol-1.

Isopropylallylcarbinol (5-Methyl-1-hexenol-4, 4-hydroxy-5-methylhexene-1)



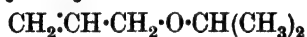
$C_7H_{14}O$ MW, 114

B.p. 139–41°. D^{15} 0.846.

Acetyl : b.p. 160–2°. D^{15} 0.891.

Fournier, *Bull. soc. chim.*, 1894, 11, 359.

Isopropyl allyl Ether



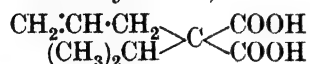
$C_6H_{12}O$ MW, 100

B.p. 82–3°/730 mm. D^{20} 0.7764.

Lippert, *Ann.*, 1893, 276, 195.

Deulofeu, *Chem. Abstracts*, 1929, 23, 1110.

Isopropylallylmalonic Acid (5-Methyl-1-hexene-4 : 4-dicarboxylic acid)



$C_9H_{14}O_4$ MW, 186

Cryst. from C_6H_6 . M.p. 112.5°.

Di-Et ester : $C_{13}H_{22}O_4$. MW, 242. B.p. 232–8°.

Hjelt, *Ber.*, 1896, 29, 1856.

Isopropylamine (2-Aminopropane)



C_3H_7N MW, 59

B.p. 32° (33–4°). D_4^{15} 0.691. $n_D^{15.4}$ 1.37698. $k = 5.3 \times 10^{-4}$ at 25°.

$B, (COOH)_2$: m.p. 160–160.5°.

B, HCl : m.p. 139.5° (153–5°).

$B, HAuCl_4$: m.p. 72–3° (140° anhyd.).

B_2, H_5AuCl_5 : m.p. 159°.

B_2, H_2PtCl_6 : decomp. at 214° (229–30°).

B_2, H_2PtBr_6 : m.p. 267°.

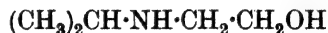
Gabriel, Ohle, *Ber.*, 1917, 50, 804.

Fabrique de produits de chimie organique de Laire, E.P., 282,083, (*Chem. Abstracts*, 1928, 22, 3668).

Nyssens, *Chem. Abstracts*, 1931, 25, 70.

Mailhe, *Compt. rend.*, 1920, 170, 1265.

2-Isopropylaminoethyl Alcohol (N-2-Hydroxyethylisopropylamine, isopropylethanolamine)



$C_5H_{13}ON$ MW, 103

Oil. B.p. 171°/741 mm. D_4^{20} 0.8970. n_D^{20} 1.4395. Sol. H_2O , EtOH, Et₂O.

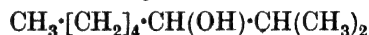
B_2, H_2PtCl_6 : m.p. about 85°. Sol. H_2O , EtOH.

Picrate : brownish-yellow prisms from H_2O . M.p. 129°. Sol. H_2O , EtOH.

Picrolonate : yellow prisms from EtOH.Aq. M.p. 228° decomp.

Matthes, *Ann.*, 1901, 315, 117.

Isopropyl-*n*-amylcarbinol (3-Hydroxy-2-methyloctane, 2-methyloctanol-3)



$C_9H_{20}O$ MW, 144

d.

$[\alpha]_D^{20} + 22.84^\circ$. D_4^{20} 0.8270. n_D^{20} 1.4314.

Acid phthalate : oil. $[\alpha]_D + 13.46^\circ$ in $CHCl_3$. *Strychnine salt* : m.p. 181–2°. $[\alpha]_D - 18.18^\circ$ in $CHCl_3$.

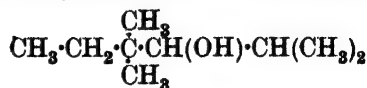
dl.

B.p. 184°.

Phenylurethane : m.p. 64°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, 101, 629.

Isopropyl-*tert.*-amylcarbinol (3-Hydroxy-2:4:4-trimethylhexane, 2:4:4-trimethylhexanol-3)



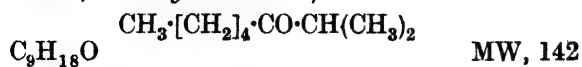
$C_9H_{20}O$ MW, 144

B.p. 170–1°.

Phenylurethane : m.p. 64°.

Haller, Bauer, *Compt. rend.*, 1910, 150, 662.

Isopropyl *n*-amyl Ketone (3-Keto-2-methyloctane, 2-methyloctanone-3)



B.p. 182–4°. D_4^{20} 0.8212.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, 101, 629.

Lowry, *J. Chem. Soc.*, 1914, 105, 92.

***N*-Isopropylaniline**



Oil. B.p. 206–8° (203–4°).

N-Acetyl: m.p. 38° (39°, 42°). B.p. 262–3°/712 mm.

Pictet, Crépieux, *Ber.*, 1888, 21, 1109.

Hickinbottom, *J. Chem. Soc.*, 1930, 994.

Reddelien, Thurm, *Ber.*, 1932, 65, 1520.

***o*-, and *p*-, Isopropylaniline.** *o*-, and *p*-, Cumidine, *q.v.*

Isopropylanisole.

See under Isopropylphenol.

***p*-Isopropylbenzaldehyde.**

See Cuminaldehyde.

Isopropylbenzanthracene.

See Isopropyl-naphthacene and Isopropyl-naphthanthracene.

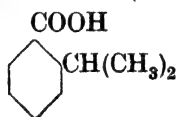
Isopropylbenzanthraquinone.

See Isopropyl-naphthacenequinone and Isopropyl-naphthanthraquinone.

Isopropylbenzene.

See Cumene.

***o*-Isopropylbenzoic Acid** (*o*-Cuminic acid)



Prisms from H_2O . M.p. 51°. Sol. EtOH, Et_2O , C_6H_6 . Mod. sol. hot H_2O .

Kothe, *Ann.*, 1888, 248, 62.

***p*-Isopropylbenzoic Acid.**

See Cuminic Acid.

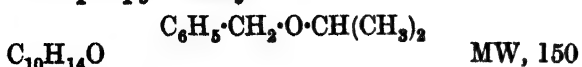
***p*-Isopropylbenzyl Alcohol.**

See Cuminy Alcohol.

***p*-Isopropylbenzylamine.**

See Cuminyamine.

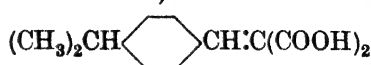
Isopropyl benzyl Ether



B.p. 193.5°/744 mm. D_4^{10} 0.9346.

Senderens, *Compt. rend.*, 1924, 178, 1412.

***p*-Isopropylbenzylidenemalonic Acid** (Cuminalmalonic acid)

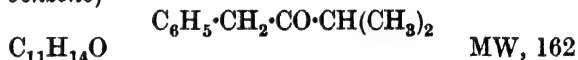


Prisms + H_2O from hot H_2O . M.p. 89–90°, anhyd. 137°: cryst. + C_6H_6 from C_6H_6 , m.p. 96–7°. Sol. MeOH, EtOH, AcOH, hot H_2O , hot C_6H_6 .

Di-Ester: $\text{C}_{17}\text{H}_{22}\text{O}_4$. MW, 290. Oil. B.p. 205–8°/11.5 mm.

Knoevenagel, *Ber.*, 1898, 31, 2616.

Isopropyl benzyl Ketone (β -Ketoisoomylbenzene)



B.p. 238–40°. D_4^{20} 0.985.

Oxime: cryst. from ligroin. M.p. 60–1°.

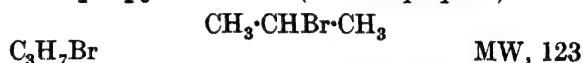
Semicarbazone: m.p. 140–1° (138°).

Kon, Thorpe, *J. Chem. Soc.*, 1919, 115, 703.

Lévy, *Bull. soc. chim.*, 1923, 33, 1661.

Mailhe, *Compt. rend.*, 1913, 157, 220.

Isopropyl bromide (2-Bromopropane)



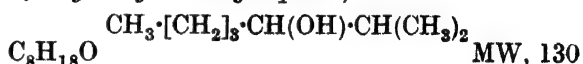
M.p. –89.0°. B.p. 59.35° (60–1°). D_4^{15} 1.32223. n_D^{15} 1.42847.

Tseng, Hou, *Chem. Abstracts*, 1934, 28, 3711.

Werner, *J. Soc. Chem. Ind.*, 1933, 52, 285t.

Timmermans, Martin, *J. chim. phys.*, 1928, 25, 423.

Isopropylbutylcarbinol (2-Methylheptanol-3, 3-hydroxy-2-methylheptane)



d-.

B.p. 72°/17 mm. D_4^{20} 0.8235. $[\alpha]_D^{20} + 27.67^\circ$ in EtOH.

Acid phthalate: m.p. 61–2°.

l-.

B.p. 87°/36 mm.

Acid phthalate: m.p. 61–2°.

dl-.

B.p. 167–8° (162°). D_4^{20} 0.8235. n_D^{20} 1.4265.

Acid phthalate: m.p. 47–8°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, 101, 629.

Isopropyl-*tert.*-butylcarbinol (2 : 2 : 4-Trimethylpentanol-3, 3-hydroxy-2 : 4 : 4-trimethylpentane)

$(\text{CH}_3)_3\text{C}\cdot\text{CH}(\text{OH})\cdot\text{CH}(\text{CH}_3)_2$
 $\text{C}_8\text{H}_{18}\text{O}$ MW, 130

M.p. -13° . B.p. $150-1^\circ$ ($145-8^\circ$). D_4^{20} 0.8298. n_D^{20} 1.4288.

Phenylurethane : m.p. 79° .

Favorsky, *Chem. Abstracts*, 1913, 7, 985.

Whitmore, Houk, *J. Am. Chem. Soc.*, 1932, 54, 3714.

Haller, Bauer, *Compt. rend.*, 1910, 150, 582.

Isopropylbutylene.

See 5-Methyl-2-hexene and 2-Methyl-3-hexene.

Isopropyl butyl Ether

$\text{CH}_3\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{O}\cdot\text{CH}(\text{CH}_3)_2$
 $\text{C}_7\text{H}_{16}\text{O}$ MW, 116

B.p. $108^\circ/738$ mm. D^{15} 0.7594. n_{D}^{25} 1.3889.

Henstock, *J. Chem. Soc.*, 1931, 372.

Isopropyl *tert.*-butyl Ether

$(\text{CH}_3)_3\text{C}\cdot\text{O}\cdot\text{CH}(\text{CH}_3)_2$
 $\text{C}_7\text{H}_{16}\text{O}$ MW, 116

B.p. 87.6° . D_4^{25} 0.7365.

Bataafsche Petroleum Maatschappij, F.P., 739,266, (*Chem. Abstracts*, 1933, 27, 1890).

Edlund, Evans, U.S.P., 1,968,601, (*Chem. Abstracts*, 1934, 5831).

Norris, Rigby, *J. Am. Chem. Soc.*, 1932, 54, 2096.

Isopropyl butyl Ketone (3-Keto-2-methylheptane, 2-methylheptanone-3)

$\text{CH}_3\cdot[\text{CH}_2]_3\cdot\text{CO}\cdot\text{CH}(\text{CH}_3)_2$
 $\text{C}_8\text{H}_{16}\text{O}$ MW, 128

B.p. $159-60^\circ$. D_4^{20} 0.8175. n_D 1.4113.

Oxime : b.p. $135-7^\circ/22$ mm.

Semicarbazone : m.p. 111° .

Pickard, Kenyon, *J. Chem. Soc.*, 1912, 101, 628.

Wallach, Fry, *Ann.*, 1915, 408, 197.

Isopropyl *tert.*-butyl Ketone (2 : 2 : 4-Trimethylpentanone-3, 3-keto-2 : 2 : 4-trimethylpentane)

$(\text{CH}_3)_3\text{C}\cdot\text{CO}\cdot\text{CH}(\text{CH}_3)_2$
 $\text{C}_8\text{H}_{16}\text{O}$ MW, 128

B.p. $134-5^\circ$, $59-60^\circ/50$ mm. D_4^{20} 0.8054 (0.8065). n_D^{25} 1.40513.

Oxime : m.p. 141° .

Faworsky, Fritzmann, *J. prakt. Chem.*, 1913, 88, 652.

Umnova, *Chem. Zentr.*, 1913, I, 1402.

Isopropylcarbinol.

See Isobutyl Alcohol.

4-Isopropylcatechol.

See 3 : 4-Dihydroxycumene.

Isopropyl chloride (2-Chloropropane)

$\text{CH}_3\cdot\text{CHCl}\cdot\text{CH}_3$
 $\text{C}_3\text{H}_7\text{Cl}$ MW, 78.5

M.p. -117° . B.p. 34.8° (36.5°). D^{15} 0.86797. n_D^{15} 1.3811.

Timmermans, *J. chim. phys.*, 1928, 25, 422.

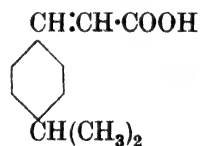
Norris, U.S.P., 1,825,814, (*Chem. Abstracts*, 1932, 26, 480).

Underwood, Gale, *J. Am. Chem. Soc.*, 1934, 56, 2119.

Curme, U.S.P., 1,545,742, (*Chem. Abstracts*, 1925, 19, 2830).

Norris, Taylor, *J. Am. Chem. Soc.*, 1924, 46, 753.

***p*-Isopropylcinnamic Acid** (Cuminalacetic acid)



$\text{C}_{12}\text{H}_{14}\text{O}_2$ MW, 190

Prisms from C_6H_6 . M.p. 165° . Sol. EtOH, hot AcOH, hot C_6H_6 .

Et ester : $\text{C}_{14}\text{H}_{18}\text{O}_2$. MW, 218. B.p. $167-9^\circ/12$ mm.

Chloride : $\text{C}_{12}\text{H}_{13}\text{OCl}$. MW, 208.5. M.p. 25° .

Amide : $\text{C}_{12}\text{H}_{15}\text{ON}$. MW, 189. M.p. 185.6° .

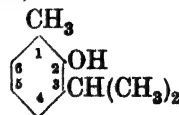
Slotta, Heller, *Ber.*, 1930, 63, 3038.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1922, 5, 933.

Isopropylcitraconic Acid.

See Isobutylmaleic Acid.

3-Isopropyl-*o*-cresol (2-Methyl-6-isopropylphenol, 2-hydroxy-*m*-cymene, 2-hydroxy-1-methyl-3-isopropylbenzene)



$\text{C}_{10}\text{H}_{14}\text{O}$ MW, 150

Pale green liq. B.p. $225-6^\circ/760$ mm. Sol. ord. org. solvents. Spar. sol. H_2O . D_4^{20} 0.9986,

D₁₅² 0.9865, $n_D^{15.2}$ 1.5239. FeCl₃ → orange-yellow col. Conc. H₂SO₄ in AcOH → red col. Hot NaOH → green col.

Me ether: C₁₁H₁₆O. MW, 164. B.p. 210–11°/760 mm. D₄⁰ 0.9515, D₁₄⁶ 0.9397. $n_D^{14.6}$ 1.5006.

Guillaumin, *Bull. soc. chim.*, 1910, 7, 335.

5-Isopropyl-*o*-cresol (2-Methyl-4-isopropylphenol, 6-hydroxy-*m*-cymene, 6-hydroxy-1-methyl-3-isopropylbenzene).

B.p. 231°, 227.5–229.5°/758 mm. Sol. H₂O. D₄⁰ 1.00122, D₁₀₀ 0.91971. KOH fusion → 5-isopropylsalicylic acid + 4-hydroxyisophthalic acid. No col. with FeCl₃.

Me ether: b.p. 217°.

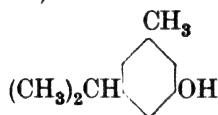
Et ether: C₁₃H₁₈O. MW, 178. B.p. 227.2–229.2° (224°). D₄⁰ 0.93866, D₁₀₀ 0.85758.

Spica, *Gazz. chim. ital.*, 1882, 12, 552.

Jesurun, *Ber.*, 1886, 19, 1413.

Jordan, U.S.P., 1,782,966, (*Chem. Abstracts*, 1931, 25, 303).

5-Isopropyl-*m*-cresol (3-Methyl-5-isopropylphenol, 5-hydroxy-*m*-cymene, 5-hydroxy-1-methyl-3-isopropylbenzene)

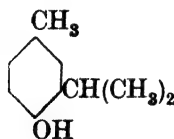


C₁₀H₁₄O MW, 150

Cryst. M.p. 54°. B.p. 241°. No col. with FeCl₃.

Knoevenagel, *Ber.*, 1894, 27, 2347.

3-Isopropyl-*p*-cresol (4-Methyl-2-isopropylphenol, 4-hydroxy-*m*-cymene, 4-hydroxy-1-methyl-3-isopropylbenzene)



C₁₀H₁₄O MW, 150

Needles from AcOH. M.p. 36°. B.p. 228–9°/763 mm. D₄⁰ 0.9954, D_{17.8} 0.9817. $n_D^{17.8}$ 1.5244. Sol. ord. org. solvents. 100 Parts H₂O dissolve 0.166 parts.

Me ether: C₁₁H₁₆O. MW, 164. B.p. 213–14°. D₄⁰ 0.9554, D_{14.8} 0.9435. $n_D^{14.8}$ 1.5087.

Guillaumin, *Bull. soc. chim.*, 1910, 7, 339.

Isopropylcresotinic Acid.

See Hydroxyisopropyltoluic Acid.

Isopropyl cyanide.

See under Isobutyric Acid.

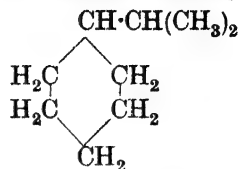
2-Isopropyl-3-cyanobutyric Ester.

See under 2-Isopropylglutaric Acid.

1-Isopropyl-1-cyanovaleric Acid.

See under Propylisopropylmalonic Acid.

Isopropylcyclohexane (*Hexahydrocumene*)



C₉H₁₈

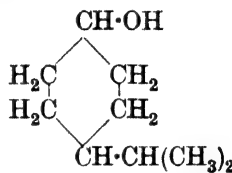
MW, 126

Oil. B.p. 154.7°. D₂₀ 0.7902.

Sabatier, Senderens, *Ann. chim. phys.*, 1905, 4, 367.

Matsubara, Perkin, *J. Chem. Soc.*, 1905, 87, 671.

4-Isopropylcyclohexanol (*Hexahydro-p-isopropylphenol*)



C₉H₁₈O

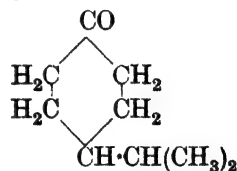
MW, 142

M.p. 8–10°. B.p. 143°/10 mm. D₁₅¹⁵ 0.9232. n_D^{20} 1.4661.

Phenylurethane: m.p. 75–7°.

Cahn, Pomfoll, Simonsen, *J. Chem. Soc.*, 1931, 1369.

4-Isopropylcyclohexanone



C₉H₁₆O

MW, 140

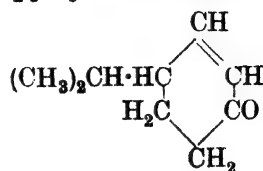
B.p. 139–40°/100 mm. D₂₅²⁵ 0.9185. n_D^{25} 1.4552.

Semicarbazone: m.p. 188–9°.

p-Nitrophenylhydrazone: m.p. 123–4°.

See previous reference.

6-Isopropylcyclohexenone-3



C₉H₁₄O

MW, 138

Occurs in *Eucalyptus cneorifolia*, D.C. B.p. 98–100°/10 mm. D_{15}^{15} 0.9476. n_D^{20} 1.484. $[\alpha]_D^{18}$ – 64.5°.

Semicarbazone : m.p. 185°.

p-Nitrophenylhydrazone : m.p. 168–9°.

2 : 4-Dinitrophenylhydrazone : m.p. 137.5–138°.

Hooper, Macbeth, Price, *J. Chem. Soc.*, 1934, 1149.

Cahn, Penfold, Simonsen, *J. Chem. Soc.*, 1931, 1368.

Isopropyl cyclohexyl Ketone.

See Hexahydroisobutyrophenone.

Isopropyldecylcarbinol.

See 2-Methyltridecanol-3.

Isopropyl decyl Ketone.

See 2-Methyltridecanone-3.

Isopropyl 2 : 4-dihydroxyphenyl Ketone.

See 4-Isobutyrylresorcinol.

Isopropylethylene.

See 3-Methylbutylene-1.

Isopropylfumaric Acid (3-Methyl-1-butylene-1 : 1-dicarboxylic acid, dimethylmesaconic acid)



$\text{C}_7\text{H}_{10}\text{O}_4$ MW, 158

Cryst. from H_2O . M.p. 186–7°. B.p. 205°/18 mm. Sol. EtOH, Et_2O , hot H_2O . Spar. sol. CHCl_3 .

Di-Et ester : $\text{C}_{11}\text{H}_{18}\text{O}_4$. MW, 214. B.p. 240–1°.

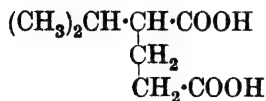
Et ester-amide : $\text{C}_9\text{H}_{15}\text{O}_3\text{N}$. MW, 185. M.p. 94–5°.

Diamide : $\text{C}_7\text{H}_{12}\text{O}_2\text{N}_2$. MW, 156. M.p. 240° decomp.

Walden, *Ber.*, 1891, 24, 2038.

Ssamenow, *Chem. Zentr.*, 1899, I, 780.

1-Isopropylglutaric Acid (2-Methylpentane-3 : 5-dicarboxylic acid, isohexane-3 : 5-dicarboxylic acid)



$\text{C}_8\text{H}_{14}\text{O}_4$ MW, 174

d-.
Needles from hot H_2O . M.p. 95° (88–9°). $[\alpha]_D^{15}$ + 9.35° in EtOH.

Anhydride : $\text{C}_8\text{H}_{12}\text{O}_3$. MW, 156. M.p. 55–6°.

$[\alpha]_D^{15}$ – 10.0° in EtOH.

Mono-anilide : m.p. 155–6°. $[\alpha]_D^{15}$ + 11.5° in EtOH.

dl-.
M.p. 95°.

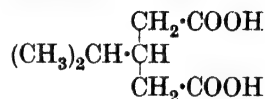
Acid brucine salt : m.p. 110° decomp. $[\alpha]_D^{15}$ – 19.4° in EtOH.

Di-Et ester : $\text{C}_{12}\text{H}_{22}\text{O}_4$. MW, 230. B.p. 158–60°/45 mm.

Read, Reid, *J. Soc. Chem. Ind.*, 1928, 47, 117.

Treibs, *Ber.*, 1931, 64, 2551.

2-Isopropylglutaric Acid



$\text{C}_8\text{H}_{14}\text{O}_4$ MW, 174

Cryst. from CHCl_3 -pet. ether. M.p. 102–102.5°. Sol. H_2O , Et_2O , C_6H_6 . Spar. sol. EtOH, CHCl_3 , CS_2 , CHCl_3 .

Di-Et ester : $\text{C}_{12}\text{H}_{22}\text{O}_4$. MW, 230. B.p. 250°.

Et ester-nitrile : 2-isopropyl-3-cyanobutyric ester. $\text{C}_{10}\text{H}_{17}\text{O}_2\text{N}$. MW, 183. B.p. 234°/755 mm.

Anhydride : $\text{C}_8\text{H}_{12}\text{O}_3$. MW, 156. Oil. B.p. 171°/30 mm.

Imide : $\text{C}_8\text{H}_{13}\text{O}_2\text{N}$. MW, 155. Plates from H_2O . M.p. 120°.

Monoanilide : plates from EtOH. M.p. 121°.

Crossley, Pratt, *J. Chem. Soc.*, 1915, 107, 174.

N-Isopropylglycine (N-Isopropylaminoacetic acid)



$\text{C}_6\text{H}_{11}\text{O}_2\text{N}$ MW, 117

Cryst. from EtOH. M.p. 192–3° decomp.

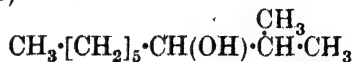
B,HCl : m.p. 203–204.5°.

Scheibler, Baumgarten, *Ber.*, 1922, 55, 1379.

Isopropylglyoxylic Acid.

See 1-Ketoisovaleric Acid.

Isopropyl-*n*-hexylcarbinol (2-Methylnonanol-3)



$\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158

d-.
B.p. 115°/28 mm. D_4^{20} 0.8290. n_D^{20} 1.4346.

$[\alpha]_D^{20}$ + 21.46°, + 24.28° in EtOH.

dl-.
B.p. 200°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, 101, 624.

Isopropyl *n*-hexyl Ketone (3-Keto-2-methylnonane, 2-methylnonanone-3)

$\text{CH}_3[\text{CH}_2]_5\cdot\text{CO}\cdot\text{CH}(\text{CH}_3)_2$
 $\text{C}_{10}\text{H}_{20}\text{O}$ MW, 156

B.p. 200–2°/700 mm. D_4^{20} 0.843. Forms no oxime or semicarbazone.

Nicolle, *Bull. soc. chim.*, 1926, 39, 61.

Isopropylhydrazine

$(\text{CH}_3)_2\text{CH}\cdot\text{NH}\cdot\text{NH}_2$
 $\text{C}_3\text{H}_{10}\text{N}_2$ MW, 74

B.p. 106–7°/750 mm. Sol. H_2O , EtOH, C_6H_6 , AcOEt. Spar. sol. Et_2O . Reduces AgNO_3 , Fehling's, and K_2CrO_4 in the cold.

B, HCl: m.p. 114° (122–3°).

Dibenzoyl deriv.: m.p. 164.5–165° (161.5°).

N-Isopropylidene: acetone isopropylhydrazone. B.p. 132–4°/750 mm.

Lochte, Noyes, Bailey, *J. Am. Chem. Soc.*, 1922, 44, 2562.

Taipale, *Chem. Zentr.*, 1924, I, 902.

α -Isopropylhydrocinnamic Acid (1-Isopropyl-2-phenylpropionic acid, isopropylbenzylacetic acid)

$\text{C}_6\text{H}_5\cdot\text{CH}_2\cdot\text{CH}(\text{CH}_3)_2\cdot\text{COOH}$
 $\text{C}_{12}\text{H}_{16}\text{O}_2$ MW, 192

Oil. B.p. 305–8°, 155–60°/6 mm.

Et ester: $\text{C}_{14}\text{H}_{20}\text{O}_2$. MW, 220. B.p. 274–6°.

Chloride: $\text{C}_{12}\text{H}_{15}\text{OCl}$. MW, 210.5. B.p. 156–8°/22 mm.


Amide: $\text{C}_{12}\text{H}_{17}\text{ON}$. MW, 191. M.p. 94–5°.

Anilide: m.p. 126.1°.

Ishikawa, Katoh, *Chem. Abstracts*, 1934, 2698.

Guerbet, *Compt. rend.*, 1908, 146, 1407.

***p*-Isopropylhydrocinnamic Acid** (*Cuminylacetic acid*)

$\text{CH}_2\cdot\text{CH}_2\cdot\text{COOH}$

 $\text{CH}(\text{CH}_3)_2$
 $\text{C}_{12}\text{H}_{16}\text{O}_2$ MW, 192

Leaflets from ligroin. M.p. 75.5° (73°). Sol. pet. ether, hot EtOH.

Amide: $\text{C}_{12}\text{H}_{17}\text{ON}$. MW, 191. M.p. 142°.

Slotta, Heller, *Ber.*, 1930, 63, 3038.

Isopropylhydroquinone.

See 2 : 5-Dihydroxycumene.

Isopropyl hydroxytolyl Ketone.

See Hydroxymethylisobutyrophenone.

Isopropylidene-acetone.

See Mesityl oxide.

Isopropylideneaniline.

See under Acetone.

Isopropylidene bromide.

See 2 : 2-Dibromopropane.

1-Isopropylidenebutane.

See 2-Methyl-2-hexene.

3-Isopropylidenebutyric Acid.

See 3-Isoheptenic Acid.

Isopropylidene chloride.

See 2 : 2-Dichloropropane.

Isopropylidene chlorobromide.

See 2-Chloro-2-bromopropane.

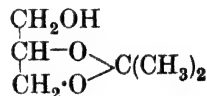
Isopropylidene-ethane.

See 2-Methylbutylene-2.

2-[Isopropylidene-ethyl]-guanidine.

See Galegine.

1 : 2-Isopropylidene-glycerol (*Acetone-glycerol*)



$\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

B.p. 104–6°/31 mm., 94–6°/21 mm., 82.5–83°/13 mm. D_4^{20} 1.064. n_D^{20} 1.4383. Sol. H_2O , EtOH, Et_2O , CHCl_3 , C_6H_6 .

Acetyl: b.p. 84°/9 mm. D_4^{15} 1.0770. n_D^{15} 1.42881.

1-Bromopropionyl: b.p. 138°/19 mm.

Caproyl: b.p. 124°/3 mm.

Lauryl: b.p. 151–2°/0.2 mm. D^{13} 0.9537. n_D^{13} 1.4454.

Palmityl: m.p. 34–5°.

Stearyl: m.p. 40–1°.

Benzoyl: m.p. 34–5°. B.p. 164–5°/9–10 mm.

p-Bromobenzoyl: m.p. 39–40°.

3 : 5-Dinitrobenzoyl: m.p. 85°.

p-Toluenesulphonyl: m.p. 47°.

Me ether: $\text{C}_7\text{H}_{14}\text{O}_3$. MW, 146. B.p. 154°/774 mm., 58–60°/14 mm.

Hibbert, Morazain, *Canadian Journal of Research*, 1930, 2, 214.

Irvine, Macdonald, Soutar, *J. Chem. Soc.*, 1915, 107, 343.

Sabalitschka, *Arch. Pharm.*, 1931, 269, 228.

3-Isopropylidene-pentane.

See 2-Methyl-3-ethyl-pentene-2.

1-Isopropylidenepropene.

See 2-Methylpentene-2.

1-Isopropylidene-propionic Acid.

See Trimethylacrylic Acid.

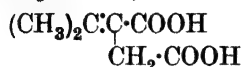
2-Isopropylidene-propionic Acid.

See Pyroterebic Acid.

3-Isopropylidenepropylene.

See 4-Methyl-1 : 3-pentadiene.

Isopropylidenesuccinic Acid (*Teraconic acid*, 3 : 3-dimethylitaconic acid, 3-methyl-2-butylene-1 : 2-dicarboxylic acid)



$\text{C}_7\text{H}_{10}\text{O}_4$ MW, 158

Cryst. from Et_2O . M.p. 160–1°. Sol. EtOH , hot H_2O . Mod. sol. Et_2O . Spar. sol. C_6H_6 , CHCl_3 . Heat of comb. 796.1 Cal. k (first) = 1.4×10^{-6} at 23° : (second) = 0.46×10^{-6} at 100°.

Mono-Et ester : $\text{C}_9\text{H}_{14}\text{O}_4$. MW, 186. M.p. 118–20°.

Di-Et ester : $\text{C}_{11}\text{H}_{18}\text{O}_4$. MW, 214. M.p. 44°. B.p. 254–5°, 197°/22 mm.

Anhydride : $\text{C}_7\text{H}_8\text{O}_3$. MW, 140. Plates from CS_2 . M.p. 44°. B.p. 197°/22 mm.

Fittig, Krafft, *Ann.*, 1899, 304, 196.

Stobbe, *Ber.*, 1903, 36, 198.

Stollé, *J. prakt. Chem.*, 1903, 67, 199.

Isopropyl iodide (2-Iodopropane)

$\text{C}_3\text{H}_7\text{I}$ MW, 170

F.p. — 90.1°. B.p. 89–45°. D_4^{20} 1.7033. n_D^{20} 1.5026.

Knoll, D.R.P., 230,172, (*Chem. Zentr.*, 1911, I, 359).

Récei, *Biochem. Z.*, 1927, 190, 57.

Timmermans, Delcourt, *J. chim. phys.*, 1934, 31, 89.

Isopropylisoamylcarbinol.

See 2 : 6-Dimethylheptanol-3.

Isopropyl isoamyl Ketone (2 : 6-Dimethylheptanone-3, 3-keto-2 : 6-dimethylheptane)



$\text{C}_9\text{H}_{18}\text{O}$ MW, 142

B.p. 171–2°.

Blaise, *Compt. rend.*, 1901, 132, 479.

Isopropylisobutylcarbinol.

See 2 : 5-Dimethylhexanol-3.

Isopropyl isobutyl Ketone (2 : 5-Dimethylhexanone-3, 3-keto-2 : 5-dimethylhexane)



$\text{C}_8\text{H}_{16}\text{O}$ MW, 128

B.p. 147–8° (146–8°). D_0^{20} 0.81223.

Oxime : b.p. 201–3°.

Semicarbazone : m.p. 142°.

Faworsky, Zacharowa, *J. prakt. Chem.*, 1913, 88, 686.

Sernagiotto, *Atti accad. Lincei*, 1919, 28, i, 435.

Mayberry, Aston, *J. Am. Chem. Soc.*, 1934, 56, 2682.

Isopropylisobutyrylcarbinol.

See Isobutyroin.

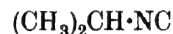
Isopropyl isocyanate

$\text{C}_4\text{H}_7\text{ON}$ MW, 85

B.p. 70–75°.

Mauguin, *Compt. rend.*, 1909, 149, 792; *Ann. chim.*, 1911, 22, 319.

Isopropyl isocyanide (*Isopropyl carbylamine*)



$\text{C}_4\text{H}_7\text{N}$ MW, 69

B.p. 87°. D_0 0.7596.

Gautier, *Ann.*, 1869, 149, 156.

Isopropyl isothiocyanate (*Isopropyl mustard oil*)



$\text{C}_4\text{H}_7\text{NS}$ MW, 101

B.p. 137–137.5°.

Jahn, *Monatsh.*, 1882, 3, 168.

Isopropylmaleic Acid (*Dimethylcitraconic acid*, 3-methyl-1-butylene-1 : 2-dicarboxylic acid)



$\text{C}_7\text{H}_{10}\text{O}_4$ MW, 158

Needles from Et_2O -ligroin. M.p. 91–3° decomp. Sol. H_2O , EtOH , Et_2O . Spar. sol. CHCl_3 . Insol. ligroin.

Anhydride : $\text{C}_7\text{H}_8\text{O}_3$. MW, 140. M.p. 5–25°. B.p. 138°/61 mm. D_0^{20} 1.1425.

Fittig, Krafft, *Ann.*, 1899, 304, 196.

Ssamenow, *Chem. Zentr.*, 1899, I, 780.

Isopropylmalonic Acid (*Isobutane-1 : 1-dicarboxylic acid*)



$\text{C}_6\text{H}_{10}\text{O}_4$ MW, 146

d.

Monoamide : $\text{C}_6\text{H}_{11}\text{O}_3\text{N}$. MW, 145. M.p. 158°. $[\alpha]_D^{25}$ + 49.81° in EtOH . *Me ester* : $\text{C}_7\text{H}_{13}\text{O}_3\text{N}$. MW, 159. M.p. 141°. $[\alpha]_D^{25}$ + 55.41° in EtOH .

l.

B.p. 95–105° in high vacuum. D_4^{18} 1.105. $[\alpha]_D^{18}$ – 0.87°.

Mono-Me ester: $C_7H_{12}O_4$. MW, 160. B.p. 95–100° in vacuo.

Monoamide: $[\alpha]_D^{18}$ – 44.4° in EtOH.

dl.

M.p. 87°. k (first) = 1.7×10^{-4} at 25°; (second) = 13.2×10^{-7} at 25°.

Mono-Me ester: b.p. 95–100°/0.3 mm. D_4^{18} 1.1055. *Amide*: $C_7H_{13}O_3N$. MW, 159. M.p. 121°.

Di-Me ester: $C_8H_{14}O_4$. MW, 174. B.p. 195°/770 mm.

Mono-Et ester: $C_8H_{14}O_4$. MW, 174. *K salt*: m.p. 92–3°. *Nitrile*: $C_8H_{13}O_2N$. MW, 155. B.p. 218–19°/745 mm., 115–16°/24–5 mm. D_{20}^{25} 0.952.

Di-Et ester: $C_{10}H_{18}O_4$. MW, 202. B.p. 215–17°, 188–188.5°/330 mm. D_{15}^{20} 0.997.

Monoamide: $C_6H_{11}O_3N$. MW, 145. M.p. 158°. *K salt*: m.p. 215°. *Nitrile*: 1-cyanoisovaleramide. $C_6H_{10}ON_2$. MW, 126. M.p. 125°. B.p. 277°/755 mm.

Mononitrile: 1-cyanoisovaleric acid. $C_6H_9O_3N$. MW, 143. B.p. 166–8°/28 mm. decomp.

Di-nitrile: $C_6H_8N_2$. MW, 108. B.p. 204–5°/752 mm. D_{18}^{26} 0.9228.

Lyman, Reid, *J. Am. Chem. Soc.*, 1917, 39, 701.

Volwiler, Tabern, *J. Am. Chem. Soc.*, 1930, 52, 1679.

Fischer, Brauns, *Ber.*, 1914, 47, 3181.

Marshall, *Rec. trav. chim.*, 1932, 51, 236.

4-Isopropylmandelic Acid (α -Hydroxy-4-isopropyl- α -toluic acid, α -hydroxy-4-isopropylphenylacetic acid, 4-isopropylphenylglycollic acid)

CH(OH)·COOH



CH(CH₃)₂

$C_{11}H_{14}O_3$

MW, 194

d.

Leaflets from H₂O. M.p. 153–4°. Sol. EtOH. $[\alpha]_D^{17}$ 134.9° in EtOH. Boiling H₂O \rightarrow dl-form.

l.

Leaflets from EtOH.Aq. M.p. 153–4°. Sol. EtOH. $[\alpha]_D^{17}$ – 135° in EtOH. Boiling H₂O \rightarrow dl-form.

dl.

Needles from H₂O. M.p. 158° (156–7°). Sol. Et₂O. Mod. sol. EtOH. Spar. sol. H₂O.

Me ether: $C_{12}H_{16}O_3$. MW, 208. Plates from H₂O. M.p. 52–3°.

Acetyl: prisms + 1H₂O from pet. ether. M.p. 60–1°.

Me ester: $C_{12}H_{16}O_3$. MW, 208. Needles from pet. ether. M.p. 80°.

Et ester: $C_{13}H_{18}O_3$. MW, 222. Cryst. M.p. 40–1°.

Amide: $C_{11}H_{15}O_2N$. MW, 193. Needles from C₆H₆. M.p. 116°. Sol. EtOH, Et₂O, hot C₆H₆, CHCl₃. Spar. sol. H₂O. Insol. pet. ether, CS₂. *Benzoyl*: cryst. M.p. 182°.

Nitrile: cuminaldehyde cyanhydrin. $C_{11}H_{13}ON$. MW, 175. *Benzoyl*: needles from EtOH. M.p. 68–9° (65°).

Plöschl, *Ber.*, 1881, 14, 1316.

Fileti, Amorretti, *Gazz. chim. ital.*, 1891, 21, 42.

Fileti, *Gazz. chim. ital.*, 1892, 22, 397.

Francis, Davis, *J. Chem. Soc.*, 1909, 95, 1406.

Aloy, Rabaut, *Bull. soc. chim.*, 1918, 23, 99.

Isopropyl Mercaptan (2-Mercaptopropane, thioisopropyl alcohol)

CH₃·CH(SH)·CH₃

C_3H_8S

MW, 76

M.p. – 130.7°. B.p. 58°. D_4^{25} 0.80851. n_D^{25} 1.4223.

Sabatier, Mailhe, *Compt. rend.*, 1910, 150, 1220.

Ellis, Reid, *J. Am. Chem. Soc.*, 1932, 54, 1677.

Isopropylmesaconic Acid.

See Isobutylfumaric Acid.

2-Isopropynaphthacene (2-Isopropyl-2' : 3'-benzanthracene)



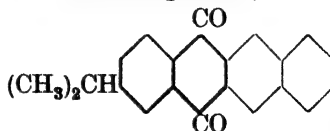
$C_{21}H_{18}$

MW, 270

Orange leaflets from xylene. M.p. 273–4°. Spar. sol. ord. org. solvents.

Cook, *J. Chem. Soc.*, 1934, 1412.

8-Isopropynaphthacenequinone (8-Isopropyl-2' : 3'-benzanthraquinone)

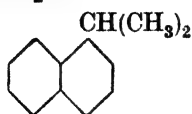


$C_{21}H_{16}O_2$

MW, 300

Yellow needles from EtOH. M.p. 131–2°.

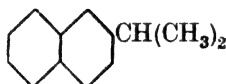
Cook, *J. Chem. Soc.*, 1934, 1412.

1-Isopropynaphthalene $C_{13}H_{14}$

MW, 170

B.p. 263-4°/769 mm., 132°/12 mm. n_D 1.5756.

Picrate : m.p. 85-6°.

Dimeride : $C_{26}H_{28}$. MW, 340. M.p. 198.5-199.5°.Herzenberg, Winterfeld, Pasch, *Ber.*, 1931, **64**, 1043.Cook, *J. Chem. Soc.*, 1932, 466.Meyer, Bernhauer, *Monatsh.*, 1929, **53** & **54**, 743.Schering-Kahlbaum, E.P., 293,001, (*Chem. Abstracts*, 1929, **23**, 1421).Roblin, Davidson, Bogert, *J. Am. Chem. Soc.*, 1935, **57**, 158.**2-Isopropynaphthalene** $C_{13}H_{14}$

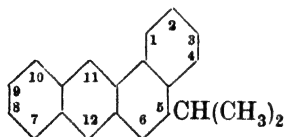
MW, 170

B.p. 263-5°, 129-30°/14 mm. (130-5°/12 mm.).

Picrate : m.p. 93-5° (91-3°, 89-90°).

Barbot, *Bull. soc. chim.*, 1930, **47**, 1318.Haworth, Letsky, Mavin, *J. Chem. Soc.*, 1932, 1790.

See also second reference above.

5-Isopropynaphthanthracene (5-Isopropyl-1' : 2'-benzanthracene) $C_{21}H_{18}$

MW, 270

Cryst. from AcOH. M.p. 92°.

Picrate : m.p. 157°.

Cook, *J. Chem. Soc.*, 1932, 468.**8-Isopropynaphthanthracene** (8-Isopropyl-1' : 2'-benzanthracene).

Needles from EtOH. M.p. 132-3°. Carcinogenic.

Picrate : m.p. 118°.

Cook, *J. Chem. Soc.*, 1932, 463.**9-Isopropynaphthanthracene** (9-Isopropyl-1' : 2'-benzanthracene).

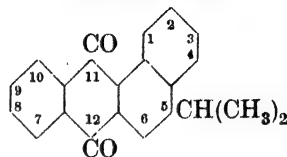
Leaflets from EtOH. M.p. 125°.

Picrate : m.p. 152°.

Cook, *J. Chem. Soc.*, 1932, 464.**12-Isopropynaphthanthracene** (12-Isopropyl-1' : 2'-benzanthracene).

Cryst. from AcOH. M.p. 94-5°.

Picrate : m.p. 157-8°.

Cook, *J. Chem. Soc.*, 1932, 468.**5-Isopropynaphthanthraquinone** (5-Isopropyl-1' : 2'-benzanthraquinone) $C_{21}H_{16}O_2$

MW, 300

Yellow needles from cyclohexane. M.p. 154-5°.

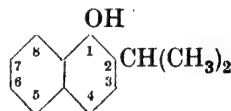
See previous reference.

8-Isopropynaphthanthraquinone (8-Isopropyl-1' : 2'-benzanthraquinone).

Orange needles from EtOH. M.p. 94°.

Cook, *J. Chem. Soc.*, 1932, 464.**9-Isopropynaphthanthraquinone** (9-Isopropyl-1' : 2'-benzanthraquinone).

Yellow needles from EtOH. M.p. 114-15°.

Cook, *J. Chem. Soc.*, 1932, 465.**2-Isopropyl-1-naphthol** $C_{13}H_{14}O$

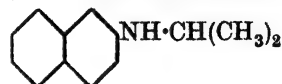
MW, 186

Leaflets from ligroin. M.p. 65-6°. B.p. 207-9°/30 mm.

Benzoyl : m.p. 121°.

Me ether : $C_{14}H_{16}O$. MW, 200. B.p. 217-22°/50-5 mm.Meyer, Bernhauer, *Monatsh.*, 1929, **53** & **54**, 744.**4-Isopropyl-1-naphthol.**

Needles. M.p. 72°. B.p. 304-9°.

Schering-Kahlbaum, D.R.P., 528,150, (*Chem. Abstracts*, 1931, **25**, 4557).Meyer, Bernhauer, *Monatsh.*, 1929, **53** & **54**, 743.**N-Isopropyl-2-naphthylamine** $C_{13}H_{15}N$

MW, 185

B.p. 307-10°, 160-5°/10 mm.

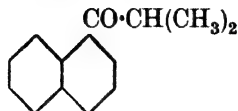
B.HCl : m.p. 209-10°.

N-Benzoyl: m.p. 96–8°.

N-p-Toluenesulphonyl: m.p. 119–20°.

Heap, *J. Chem. Soc.*, 1933, 495.

Isopropyl 1-naphthyl Ketone (1-Isobutyryl-naphthalene)



$C_{14}H_{14}O$ MW, 198

B.p. 308–10°, 172–4°/8 mm. Sol. ord. org. solvents. D_0^{20} 1.0761.

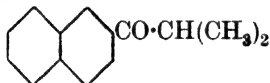
Oxime: m.p. 140°.

Picrate: m.p. 66–7°.

Rousset, *Bull. soc. chim.*, 1896, 15, 66.

Volmar, *Compt. rend.*, 1910, 150, 1175.

Isopropyl 2-naphthyl Ketone (2-Isobutyryl-naphthalene)



$C_{14}H_{14}O$ MW, 198

B.p. 312–14°, 176°/8 mm. Sol. EtOH, Et₂O, C₆H₆, CS₂. D_0^{20} 1.0617.

Oxime: m.p. 121–2°. B.p. 202–3°/12 mm.

Rousset, *Bull. soc. chim.*, 1896, 15, 68.

Isopropyl nitrate



$C_3H_7O_3N$ MW, 105

B.p. 101–2°. D_0^{19} 1.036. n_D^{20} 1.391.

Silva, *Ann.*, 1870, 154, 256.

Isopropyl nitrite



$C_3H_7O_2N$ MW, 89

B.p. 45°/762 mm., 39–39.5°/752 mm. D_0^{20} 0.856.

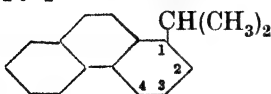
Silva, *Bull. soc. chim.*, 1869, 12, 227.

Bewad, *Ber.*, 1892, 25, 571R.

3-Isopropylpentanol-2.

See 2-Methyl-3-ethylpentanol-4.

1-Isopropylphenanthrene



$C_{17}H_{16}$ MW, 220

Prisms from EtOH. M.p. 85–6°.

Picrate: yellow needles from MeOH. M.p. 125–6°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

2-Isopropylphenanthrene.

Prisms from EtOH. M.p. 44–5°.

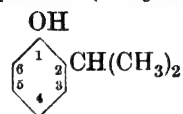
Picrate: yellow needles from MeOH. M.p. 108°.

See previous reference.

Isopropylphenetole.

See under Isopropylphenol.

o-Isopropylphenol (o-Hydroxycumene)



$C_9H_{12}O$ MW, 136

M.p. 15–16°. B.p. 212–14°. D_0^{20} 1.012. n_D^{20} 1.5315.

Me ether: o-isopropylanisole. $C_{10}H_{14}O$. MW, 150. B.p. 198–9°/751 mm. D_0^{16} 0.9532. n_D^{15} 1.50891.

Et ether: o-isopropylphenetole. $C_{11}H_{16}O$. MW, 164. B.p. 208.6–209.6°/762.2 mm. D_0^{20} 0.94438.

Isopropyl ether: $C_{12}H_{18}O$. MW, 178. B.p. 225–7°/745 mm. D_0^{25} 0.9192. n_D^{25} 1.4948.

Smith, *J. Am. Chem. Soc.*, 1934, 56, 718.

Niederl, Storch, *J. Am. Chem. Soc.*, 1933, 55, 293.

Sowa, Hinton, Nieuwland, *ibid.*, 3402.

m-Isopropylphenol (m-Hydroxycumene).

M.p. 26°. B.p. 228°. Spar. sol. H₂O.

Me ether: m-isopropylanisole. B.p. 210–11°. D_0^{20} 0.9624.

Behal, Tiffeneau, *Bull. soc. chim.*, 1908, 3, 317.

Jacobsen, *Ber.*, 1878, 11, 1062.

p-Isopropylphenol (p-Hydroxycumene).

M.p. 61°. B.p. 223–5°. D_0^{20} 0.990. n_D^{20} 1.5228.

Me ether: p-isopropylanisole. B.p. 212–13°/758 mm., 95–6°/19 mm. D_0^{17} 0.94952. n_D^{17} 1.5045.

Et ether: p-isopropylphenetole. B.p. 219.7–220.7°/757.7 mm.

Bert, *Compt. rend.*, 1923, 177, 452.

Jordan, U.S.P., 1,782,966, (*Chem. Abstracts*, 1931, 25, 303).

Smith, *J. Am. Chem. Soc.*, 1934, 56, 718.

Schering-Kahlbaum, F.P., 684,037, (*Chem. Abstracts*, 1930, 24, 5307).

Krauz, Remenec, *Chem. Abstracts*, 1930, 24, 1365.

Isopropylphenylacetone.

See Isobutyl benzyl Ketone.

Isopropylphenylcarbinol (α -Hydroxyisobutylbenzene, 1-hydroxy-3-methyl-1-phenylpropane, 1-hydroxy-1-phenylisobutane)



$\text{C}_{10}\text{H}_{14}\text{O}$ MW, 150

B.p. 222–4°, 110–11°/13 mm., 97·5–98·5°/9 mm. D_{20}^{20} 0·9790. $n_D^{13\cdot7}$ 1·51932.

Acetyl: b.p. 122–5°/20 mm., 118–20°/16 mm., 106–8°/9·5 mm.

Stephens, *J. Am. Chem. Soc.*, 1928, **50**, 190.

Franke, Klein, *Monatsh.*, 1912, **33**, 1237.

Faworsky, Mandryka, *Chem. Zentr.*, 1913, I, 1010.

Isopropyl phenyl Ether



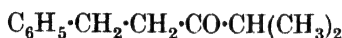
$\text{C}_9\text{H}_{12}\text{O}$ MW, 136

B.p. 178°. D_{20}^{20} 0·978. n_D^{20} 1·4992.

Levaillant, *Compt. rend.*, 1929, **188**, 261.

Smith, *J. Am. Chem. Soc.*, 1934, **56**, 718.

Isopropyl phenylethyl Ketone (2-Methyl-5-phenylpentanone-3)



$\text{C}_{12}\text{H}_{16}\text{O}$ MW, 176

B.p. 256°, 126–7°/8 mm. D_4^{20} 0·9755.

Oxime: b.p. 156–8°/8 mm.

Semicarbazone: m.p. 93° (86°).

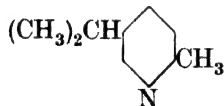
Senderens, *Compt. rend.*, 1911, **152**, 384.

Rupe, Hirschmann, *Helv. Chim. Acta*, 1931, **14**, 699.

Isopropyl phenyl Ketone.

See Isobutyrophenone.

5-Isopropyl- α -picoline (2-Methyl-5-isopropylpyridine)



$\text{C}_9\text{H}_{13}\text{N}$ MW, 135

B.p. 190–1°, 73–4°/15 mm. D_4^{20} 0·9237, D_{15}^{15} 0·9114.

$B, H, AuCl_4$: m.p. 93–4°.

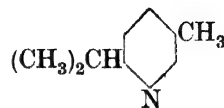
$B_2, H_2, PtCl_6$: reddish-yellow cryst. + H_2O . M.p. 93–4°, anhyd. 137–8° (131°).

Picrate: yellow cryst. M.p. 167·5° (166–7°).

Oparina, *Chem. Abstracts*, 1930, **24**, 4785.

Curtius, Bertho, *Ber.*, 1926, **59**, 588.

6-Isopropyl- β -picoline (3-Methyl-6-isopropylpyridine)



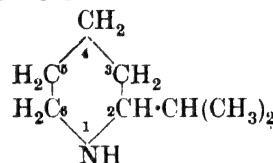
$\text{C}_9\text{H}_{13}\text{N}$ MW, 135

$B_2, H_2, PtCl_6$: cryst. M.p. 163–4° decomp.

Picrate: prisms from EtOH. M.p. 146°.

Bertho, Curtius, Schmidt, *Ber.*, 1927, **60**, 1719.

2-Isopropylpiperidine



$\text{C}_8\text{H}_{17}\text{N}$ MW, 127

dl.

B.p. 162°. D_4^{20} 0·8668. Spar. sol. H_2O .

B, HCl : cryst. from EtOH– Me_2CO . M.p. 216° (210°).

B, HBr : m.p. 233°.

B, HI : leaflets from C_6H_6 . M.p. 243°.

$B_2, H_2, PtCl_6$: m.p. 215–16° (193–193·5°).

Chloroaurate: m.p. 123–4°.

Picrate: cryst. from EtOH.Aq. M.p. 137–8°.

$N\text{-Me}$: $\text{C}_8\text{H}_{15}\text{N}$. MW, 141. B.p. 165–7°. D_4^{20} 0·8593. $B, H, AuCl_4$: m.p. 131°. $B_2, H_2, PtCl_6$: plates from H_2O . M.p. 99–100°. Picrate: yellow needles from H_2O . M.p. 149°.

l.

B.p. 161·5°. D_{19}^{19} 0·8503. $[\alpha]_D - 13\cdot1^\circ$.

B, HCl : needles from Me_2CO . M.p. 232°.

Chloroplatinate: m.p. 213–14°.

Acid d-tartrate: m.p. 51·5–52·5°.

Ladenburg, *Ann.*, 1888, **247**, 73.

Sobecki, *Ber.*, 1908, **41**, 4105.

4-Isopropylpiperidine.

B.p. 168–71°. Fumes in air. Mod. sol. H_2O .

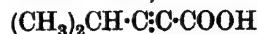
$B_2, H_2, PtCl_6$: yellow prisms. M.p. 172°.

Ladenburg, *Ann.*, 1888, **247**, 79.

Isopropylpropenylcarbinol.

See 5-Methyl-2-hexenol-4.

Isopropylpropionic Acid (3 : 3-Dimethyl-tetrolic acid, isosorbic acid)



$\text{C}_6\text{H}_8\text{O}_2$ MW, 112

Cryst. M.p. 38° (36–8°). B.p. 106–7°/20 mm., 114–15°/18 mm.

Me ester: $\text{C}_8\text{H}_{10}\text{O}_2$. MW, 126. B.p. 68–9°/20 mm. D_4^{20} 0·9509.

Et ester: $C_8H_{12}O_2$. MW, 140. B.p. $83^\circ/19$ mm. D_0^{20} 0.9365.

Isobutyl ester: $C_{10}H_{16}O_2$. MW, 168. B.p. $99-101^\circ/19$ mm. D_0^{20} 0.9145.

Faworsky, *J. prakt. Chem.*, 1888, **37**, 423.
 Moureu, Delange, *Bull. soc. chim.*, 1903, **29**, 652.

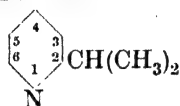
Isopropylpropionylcarbinol.

See 2-Methyl-3-hexanolone-4.

Isopropylpropylene.

See 4-Methyl-1-pentene and 4-Methyl-2-pentene.

2-Isopropylpyridine (α -Isopropylpyridine)



$C_8H_{11}N$

MW, 121

B.p. $158-9^\circ$. Spar. sol. H_2O . D_0^{20} 0.9342.

$B, HgCl_2$: m.p. 93° .

$B, HAuCl_4$: m.p. 91° ($91-2^\circ$).

B_2, H_2PtCl_6 : m.p. 170° decomp.

Picrate: m.p. 116° .

Königs, Happe, *Ber.*, 1902, **35**, 1346.

3-Isopropylpyridine (β -Isopropylpyridine).

B.p. $177-8^\circ$. D_{16}^{20} 0.9227.

$B, HAuCl_4$: m.p. 100° .

B_2, H_2PtCl_6 : m.p. 186° .

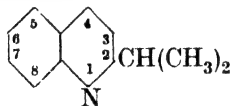
Picrate: m.p. 136° .

Oparina, *Chem. Zentr.*, 1926, **I**, 3337.

Isopropylpyruvic Acid.

See 1-Ketoisocaproic Acid.

2-Isopropylquinoline



$C_{12}H_{13}N$

MW, 171

Liq. with odour resembling quinoline. B.p. 255° . Volatile in steam.

Chloroaurate: m.p. about 123° .

$B_2, H_2PtCl_6, 2H_2O$: orange needles from H_2O . M.p. 195° decomp.

Picrate: cryst. from EtOH. M.p. $155-7^\circ$.

Methiodide: plates from EtOH. M.p. 182° .

Koenigs, *Ber.*, 1899, **32**, 229.

Doebner, *Ann.*, 1887, **242**, 279.

3-Isopropylquinoline.

Cryst. M.p. about 10° . B.p. $275-80^\circ/715$ mm. Sol. EtOH, Et₂O, C_6H_6 . Insol. H_2O .

Spady, *Ber.*, 1885, **18**, 3383.

4-Isopropylquinoline.

Oil. Volatile in steam.

$B_2, H_2PtCl_6, 1\frac{1}{2}H_2O$: m.p. 204° decomp.

Picrate: yellow needles from EtOH. M.p. $172-3^\circ$.

Methiodide: yellow cryst. M.p. about 173° decomp.

Koenigs, *Ber.*, 1898, **31**, 2375; 1899, **32**, 224.

7-Isopropylquinoline.

Oil. Volatile in steam.

$B_2, H_2PtCl_6, 2H_2O$: yellow needles from H_2O . M.p. $219-20^\circ$.

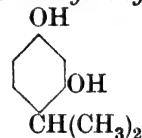
Dichromate: red prisms. M.p. about 92° .

Picrate: yellow needles from Et₂O. M.p. $205-6^\circ$.

Methiodide: yellow needles. M.p. about 200° .

Widman, *Ber.*, 1886, **19**, 267.

4-Isopropylresorcinol (2 : 4-Dihydroxyisopropylbenzene, 2 : 4-dihydroxycumene)



$C_9H_{12}O_2$

MW, 152

Cryst. from AcOH.Aq. M.p. 105° .

Meyer, Bernhauer, *Monatsh.*, 1929, **53** & **54**, 737.

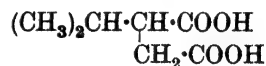
4-Isopropylsalicylic Acid.

See 2-Hydroxycuminic Acid.

Isopropylstyrene.

See Methyl-phenyl-1-butylene.

Isopropylsuccinic Acid (3-Methylbutane-1 : 2-dicarboxylic acid, isopentane-3 : 4-dicarboxylic acid)



$C_7H_{12}O_4$

MW, 160

d.

M.p. $87-8^\circ$. $[\alpha]_D^{20} + 24.01^\circ$ in H_2O .

Strychnine salt: m.p. $124-31^\circ$.

Anilide: m.p. 200° .

l.

Di-Et ester: $C_{11}H_{20}O_4$. MW, 216. B.p. $119-20^\circ$.

dl.

M.p. 120° (118°). B.p. $212^\circ/12$ mm. Sol. EtOH, Et₂O, C_6H_6 , $CHCl_3$. $k = 7.5 \times 10^{-5}$ at 25° .

Di-Et ester: b.p. $236-40^\circ$.

Dichloride: $C_7H_{10}O_2Cl_2$. MW, 197. B.p. 210° decomp.

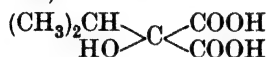
Anhydride: $C_7H_{10}O_3$. MW, 142. B.p. 255° , $164^\circ/45$ mm.

Kachler, *Ann.*, 1873, **169**, 168.

Braun, Reinhard, *Ber.*, 1929, **62**, 2586.

Henry, Paget, *J. Chem. Soc.*, 1928, 76.

Isopropyltartronic Acid (*Hydroxy-isopropylmalonic acid*, *1-hydroxyisobutane-1:1-dicarboxylic acid*)

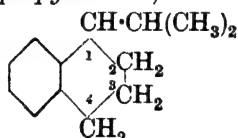


$C_6H_{10}O_5$ MW, 162

Cryst. from H_2O . M.p. 149° decomp.

Brunner, *Monatsh.*, 1894, **15**, 766.

1-Isopropyl-1:2:3:4-tetrahydronaphthalene (*1-Isopropyltetralin*)



$C_{13}H_{18}$ MW, 174

B.p. 247° . D_4^{25} 0.9450.

Roblin, Davidson, Bogert, *J. Am. Chem. Soc.*, 1935, **57**, 157.

2-Isopropyl-1:2:3:4-tetrahydronaphthalene (*2-Isopropyltetralin*).

B.p. $124-6^\circ/13$ mm.

Barbot, *Bull. soc. chim.*, 1930, **47**, 1318.

Isopropyltetralin.

See Isopropyltetrahydronaphthalene.

Isopropyl thiocyanate



C_4H_7NS MW, 101

B.p. $152-3^\circ/754$ mm. D_4^{20} 0.963.

Henry, *Ber.*, 1869, **2**, 496.

Gerlich, *Ann.*, 1875, **178**, 83.

Isopropylthiourea

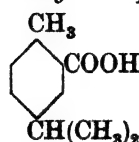


$C_4H_{10}N_2S$ MW, 118

Leaflets. M.p. 157° .

Jahn, *Monatsh.*, 1882, **3**, 168.

4-Isopropyl-o-toluic Acid (*p-Cymene-2-carboxylic acid*, *2-methyl-5-isopropylbenzoic acid*)



$C_{11}H_{14}O_2$ MW, 178

Cryst. from EtOH.Aq. M.p. 70° . B.p. $171-2^\circ/20$ mm. Sol. most org. solvents. Spar. sol. H_2O . Volatile in steam.

Me ester: $C_{12}H_{16}O_2$. MW, 192. B.p. $132^\circ/16.2$ mm.

Chloride: $C_{11}H_{13}OCl$. MW, 196.5. B.p. $135.5-136^\circ/21.5$ mm., $131.5-132^\circ/17.7$ mm.

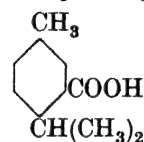
Amide: $C_{11}H_{15}ON$. MW, 177. M.p. 147° .

Anilide: m.p. 143.5° .

Le Fèvre, *J. Chem. Soc.*, 1933, 983.

Bogert, Tuttle, *J. Am. Chem. Soc.*, 1916, **38**, 1349.

4-Isopropyl-m-toluic Acid (*p-Cymene-3-carboxylic acid*, *3-methyl-6-isopropylbenzoic acid*)



$C_{11}H_{14}O_2$ MW, 178

Needles from H_2O . M.p. $82-3^\circ$ (84°). B.p. 285° . Sol. most org. solvents. Volatile in steam.

Me ester: $C_{12}H_{16}O_2$. MW, 192. B.p. $128-9^\circ/13.5$ mm.

Et ester: $C_{13}H_{18}O_2$. MW, 206. B.p. $141-2^\circ/13.5$ mm.

Phenyl ester: $C_{17}H_{18}O_2$. MW, 254. B.p. $199-208^\circ/22.5-24.5$ mm.

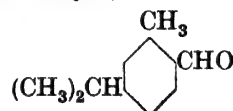
Chloride: $C_{11}H_{13}OCl$. MW, 196.5. B.p. $128-9^\circ/20.1$ mm., $115-16^\circ/9.2$ mm.

Amide: $C_{11}H_{15}ON$. MW, 177. M.p. $137-5^\circ$.

Anilide: m.p. 151° .

See previous references.

5-Isopropyl-o-toluic Aldehyde (*2-Methyl-4-isopropylbenzaldehyde*)



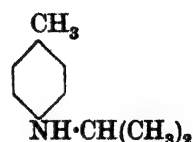
$C_{11}H_{14}O$ MW, 162

B.p. 238° , $132^\circ/20$ mm. D_4^{20} 0.9988.

Verley, *Bull. soc. chim.*, 1897, **17**, 913.

Bouveault, *ibid.*, 942.

N-Isopropyl-p-toluidine

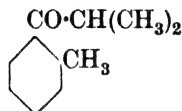


$C_{10}H_{15}N$ MW, 149

Oil. B.p. 219–21°. D_4^{20} 0.9226. n_D^{20} 1.5332.
B,HCl: m.p. 170–1°.
*B*₂, (COOH)₂: m.p. 129–30°.

Hori, Morley, *J. Chem. Soc.*, 1891, 59, 34.

Isopropyl o-tolyl Ketone (*o*-Isobutyryl-toluene, *o*-methylisobutyrophenone)

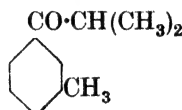


$C_{11}H_{14}O$ MW, 162

B.p. 230°/758 mm. D_4^{20} 0.9858.

Senderens, *Bull. soc. chim.*, 1911, 9, 949.

Isopropyl m-tolyl Ketone (*m*-Isobutyryl-toluene, *m*-methylisobutyrophenone)



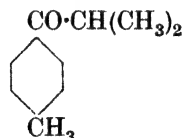
$C_{11}H_{14}O$ MW, 162

B.p. 238°/758 mm. D_4^{20} 0.9841.

Semicarbazone: m.p. 120°.

Senderens, *Bull. soc. chim.*, 1911, 9, 950.

Isopropyl p-tolyl Ketone (*p*-Isobutyryl-toluene, *p*-methylisobutyrophenone)



$C_{11}H_{14}O$ MW, 162

B.p. 243°/758 mm., 117–18°/13 mm. $D_4^{21.2}$ 0.9681. $n_D^{21.2}$ 1.519.

Semicarbazone: m.p. 101°.

See previous reference and also

Auwers, *Ann.*, 1915, 408, 244.

Isopropylurea



$C_4H_{10}ON_2$ MW, 102

Needles from AcOEt. M.p. 154°. Sol. H_2O , EtOH, $CHCl_3$, Me_2CO , hot C_6H_6 . Spar. sol. Et_2O , AcOEt.

N-Acetyl: m.p. 68–72°.

Mauguin, *Ann. chim.*, 1911, 22, 321.

Isopropylurethane (*Ethyl isopropylamino-formate*)



$C_6H_{13}O_2N$ MW, 131

B.p. 79°/15 mm. Sol. EtOH, Et_2O . D_4^{18} 0.957.

Mauguin, *Ann. chim.*, 1911, 22, 324.

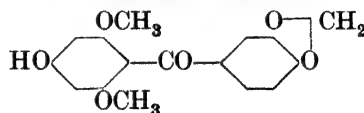
Isopropylvaleric Acid.

See 2-Methylhexane-3-carboxylic Acid and 5-Methyl-*n*-heptylic Acid.

4-Isopropyl-o-xylene.

See 3 : 4-Dimethylcumene.

Isoprotocotoin (3 : 4-Methylenedioxy-4'-hydroxy-2' : 6'-dimethoxybenzophenone)

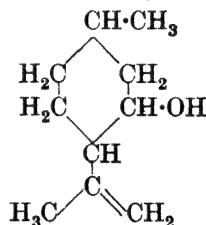


$C_{16}H_{14}O_6$ MW, 302

Needles from MeOH. M.p. 165–6°. Sol. MeOH, AcOH, $CHCl_3$, Me_2CO . Spar. sol. Et_2O , C_6H_6 , hot H_2O .

Houben, Fischer, *J. prakt. Chem.*, 1929, 123, 89, 102.

Isopulegol (5-Methyl-2-isopropenylcyclohexanol, $\Delta^{8(9)}$ -p-menthenol-3)



$C_{10}H_{18}O$ MW, 154

d-.

Occurs in leaves of *Leptospermum Liversidgei*, Baker & Smith. B.p. 93–4°/14 mm. D_4^{20} 0.911. n_D^{20} 1.4723.

Naphthylurethane: m.p. 112–13°.

Et ether: $C_{12}H_{22}O$. MW, 182. B.p. 85–8°/14 mm.

l-.

B.p. 94°/14 mm., 88°/10 mm. D_4^{20} 0.9110. n_D^{20} 1.4723.

Acetyl: b.p. 103°/14 mm.

Propionyl: b.p. 91°/4 mm.

Butyryl: b.p. 116°/15 mm.

Valeryl: b.p. 119°/4 mm.

Caproyl: b.p. 153°/13 mm.

Lauryl: b.p. 188°/3 mm.

Myristyl: b.p. 189°/2 mm.

Acid phthalate : m.p. 106°.

Hydrate : see *p*-Menthadiol-3 : 8.

Pickard, Hunter, Lewcock, de Pennington, *J. Chem. Soc.*, 1920, 117, 1252.

Prins, *Chem. Abstracts*, 1917, 11, 2773.

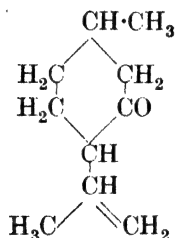
Dolvis, *Revue de chimie industrielle*, 1924, 33, 213, 326; 1925, 34, 82, 114.

Dœuvre, *Bull. soc. chim.*, 1933, 53, 592.

Horiuchi, *Chem. Abstracts*, 1928, 22, 3886.

Naves, *Parfums de France*, 1928, 6, 191 (Review, Bibl.).

Isopulegone (α -Pulegone, $\Delta^{8(9)}$ -*p*-menth-*n*-one-3)



$C_{10}H_{16}O$

MW, 152

d-.

Occurs in oil of *Mentha pulegium*, Linn. B.p. 100°/18 mm., 95°/14 mm. D_4^{20} 0.9198. n_D^{20} 1.4675. *Enol form* : b.p. 80-1°/6 mm. D_4^{14} 0.8955. n_D^{20} 1.46732.

Oxime : m.p. 121°.

Semicarbazone : m.p. 174-5° (172-3°).

l-.

B.p. 98-100°/13 mm. $D^{19.5}$ 0.9192.

Oxime : (a) m.p. 120-1°. (b) M.p. 98°.

Semicarbazone : m.p. 173-4° decomp.

dl-.

Oxime : m.p. 138-9° (134°).

Semicarbazone : m.p. 183°.

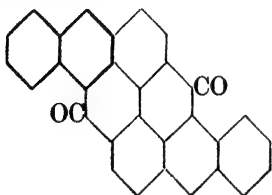
Grignard, Savard, *Bull. soc. chim. Belg.*, 1927, 36, 97.

Linstead, Noble, *J. Chem. Soc.*, 1934, 612.

Isopurpurin.

See Anthrapurpurin.

Isopyranthrone



$C_{30}H_{14}O_2$

MW, 406

Dark grey or violet needles with metallic lustre from $PhNO_2$. M.p. above 360°. Sol.

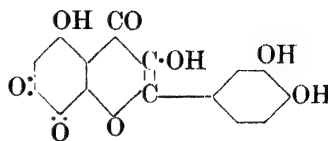
xylene, $PhNO_2$, aniline, quinoline, to reddish-violet sols.

Scholl, Tanzer, *Ann.*, 1923, 433, 177.

Isopyromucic Acid.

See Hydroxycoumalin.

Isoquercetone



$C_{15}H_8O_8$

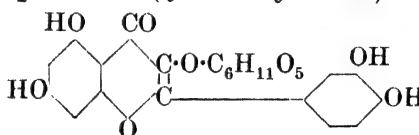
MW, 316

Tetra-Me ether : $C_{19}H_{16}O_8$. MW, 372. Yellow needles. M.p. 242-4°.

Tetra-acetyl : m.p. 240-2°.

Nierenstein, *J. Chem. Soc.*, 1915, 107, 869.

Isoquercitrin (Quercetin glucoside)



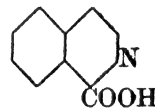
$C_{21}H_{20}O_{12}$

MW, 464

Occurs in cotton flowers and maize. Yellow needles. M.p. 220-222.5°. Sol. AcOEt. Spar. sol. H_2O . $FeCl_3 \rightarrow$ olive-green col.

Perkin, *J. Chem. Soc.*, 1909, 95, 2190.

Isoquinaldinic Acid (Isoquinoline-1-carboxylic acid)



$C_{10}H_7O_2N$

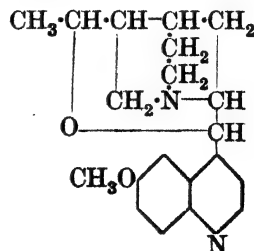
MW, 173

Cryst. from C_6H_6 . M.p. 161° decomp. Sol. MeOH, AcOH, $CHCl_3$, Me_2CO , hot H_2O , hot EtOH.

Nitrile : see 1-Cyanoisoquinoline.

Reissert, *Ber.*, 1905, 38, 3429.

α -Isoquinidine



$C_{20}H_{24}O_2N_2$

MW, 324

Needles from EtOH.Aq. M.p. 142°.

Konapnicki, Suszko, *Chem. Abstracts*, 1930, **24**, 1647.

Domanski, Suszko, *Chem. Abstracts*, 1933, **27**, 3713.

Konapnicki, Ludwiczakowna, Suszko, *ibid.*, 5080.

Isoquinoline



C_9H_7N

MW, 129

Occurs in coal tar. Hygroscopic cryst. M.p. 24-6°. B.p. 242°, 142°/40 mm. D_4^{20} 1.0986. n_D^{20} 1.6148. Heat of comb. C_p 1123.7 Cal. Alk. ox. \rightarrow cinchomeric, phthalic, and oxalic acids. Neutral ox. \rightarrow phthalimide.

Methiodide: yellow needles + $1H_2O$ from H_2O . M.p. 159°.

Methiodide: m.p. 159°.

Ethiodide: m.p. 148°.

Benzylidide: m.p. 175-6°.

Acid sulphate: m.p. 207.5°.

B_3HAuCl_4 : m.p. 225°.

$B_3H_2PtCl_6$: m.p. 263° decomp.

Picrate: m.p. 222-3°.

Le Blanc, *Ber.*, 1888, **21**, 2299.

Gesellschaft für Teerverwertung, D.R.P., 285,666, (*Chem. Abstracts*, 1916, **10**, 965).

Harris, Pope, *J. Chem. Soc.*, 1922, **121**, 1030.

Tartarini, Samaja, *Chem. Abstracts*, 1933, **27**, 5741.

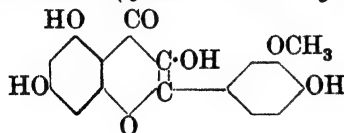
Forsyth, Kelly, Pyman, *J. Chem. Soc.*, 1925, 1661.

Wedekind, Oechslen, *Ber.*, 1901, **34**, 398.

Isoquinoline-1-carboxylic Acid.

See Isoquinoline-1-carboxylic Acid.

Isorhamnetin (Quercetin 3'-methyl ether)



$C_{16}H_{12}O_7$

MW, 316

Occurs in petals of wallflowers and in *Trifolium pratense*, Linn. Greenish-yellow cryst. from AcOH. M.p. 305° decomp. Spar. sol. EtOH, AcOH. Insol. C_6H_6 , $CHCl_3$.

Tetra-acetyl: m.p. 205-7° (198-200°).

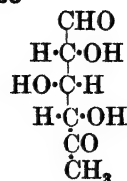
Power, Salway, *J. Chem. Soc.*, 1910, **97**, 245.

Fukuda, *Bull. Chem. Soc. Japan*, 1928, **3**, 53.

Heap, Robinson, *J. Chem. Soc.*, 1926, 2342.

Dict. of Org. Comp.—II.

Isorhamnonose



$C_5H_{10}O_5$

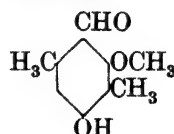
MW, 162

M.p. 125.5-126°. Sol. H_2O , EtOH, Py. Spar. sol. other org. solvents. $[\alpha]_D^{20}$ -33.7°. Reduces Fehling's in the cold.

Di-p-nitrophenylhydrazone: m.p. 120.5° decomp.

Helferich, Himmen, *Ber.*, 1929, **62**, 2139.

Isorhizonaldehyde (4-Hydroxy-2-methoxy-3:6-dimethylbenzaldehyde)



$C_{10}H_{12}O_3$

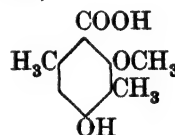
MW, 180

Needles from MeOH.Aq. M.p. 151°.

Acetyl: m.p. 67°.

Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1677.

Isorhizonic Acid (4-Hydroxy-2-methoxy-3:6-dimethylbenzoic acid)



$C_{10}H_{12}O_4$

MW, 196

Needles from C_6H_6 . M.p. 156-7° decomp. Sol. EtOH, Me_2CO , AcOEt. Spar. sol. ligroin.

Me ester: $C_{11}H_{14}O_4$. MW, 210. M.p. 142°.

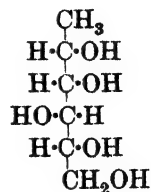
Et ester: $C_{12}H_{16}O_4$. MW, 224. M.p. 103°.

Acetyl: m.p. 160°. *Chloride* m.p. 84°.

Anilide: m.p. 179°.

See previous reference.

Isorhodeitol



$C_6H_{14}O_5$

MW, 166

30

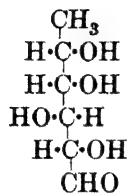
Syrup. $[\alpha]_D -9.7^\circ$.

Benzylidene deriv.: m.p. 158° .

Di-benzylidene deriv.: m.p. $196-7^\circ$.

Votoček, Valentin, *Bull. soc. chim.*, 1928, 43, 219.

Isorhodeose (d-Glucomethylose)



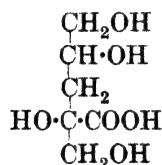
$\text{C}_6\text{H}_{12}\text{O}_5$ MW, 164

Occurs in cinchona bark. Cryst. $[\alpha]_D +30.3^\circ$.

Votoček, Rac, *Chem. Abstracts*, 1932, 26, 4307.

See also previous reference.

Isosaccharic Acid



$\text{C}_6\text{H}_{12}\text{O}_6$ MW, 180

α -, d-.

$[\alpha]_D +44.5^\circ$.

Brucine salt: m.p. anhyd. 164° .

Quinine salt: m.p. $191-2^\circ$ ($202-4^\circ$).

Amide: $\text{C}_6\text{H}_{13}\text{O}_5\text{N}$. MW, 179. M.p. $84-9^\circ$ decomp.

Lactone: see Isosaccharolactone.

β -, d-.

Brucine salt: m.p. $200-1^\circ$.

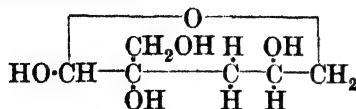
Weerman, *Rec. trav. chim.*, 1918, 37, 41.

Nef, *Ann.*, 1910, 376, 52.

Hintikka, *Chem. Abstracts*, 1923, 17, 3486.

Levene, La Forge, *J. Biol. Chem.*, 1915, 21, 358.

Isosaccharinose



$\text{C}_6\text{H}_{12}\text{O}_5$ MW, 164

Syrup. Insol. Et_2O . $[\alpha]_D^{15} -20.66^\circ$ in H_2O .

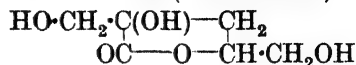
Reduces Fehling's.

p-Nitrophenylhydrazone: m.p. $168-9^\circ$.

1:2':4-Triacetyl: (a) m.p. 98° . (b) M.p. $85-6^\circ$.

Schorigin, Makarowa-Semljanskaja, *Ber.*, 1933, 66, 387.

Isosaccharolactone (Isosaccharin)



$\text{C}_6\text{H}_{10}\text{O}_5$ MW, 162

α -, d-.

Cryst. from AcOEt . M.p. 96° . Sol. H_2O , MeOH , EtOH , glycerol. Spar. sol. Et_2O . $[\alpha]_D^{20} -61.9^\circ$ in H_2O . $k = 1.15 \times 10^{-6}$ at 25° .

β -, d-.

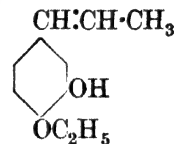
Not obtained pure.

Upson, *Am. Chem. J.*, 1911, 45, 469.

Schorigin, Makarowa-Semljanskaja, *Ber.*, 1933, 66, 387.

Nef, *Ann.*, 1910, 376, 52, 64.

Isosafroeugenol (3-Hydroxy-4-ethoxy-1-propenylbenzene)



$\text{C}_{11}\text{H}_{14}\text{O}_2$ MW, 178

M.p. 85° .

Me ether: 3-methoxy-4-ethoxy-1-propenylbenzene. $\text{C}_{12}\text{H}_{16}\text{O}_2$. MW, 192. M.p. $62-63.5^\circ$.

Acetyl: m.p. 67° .

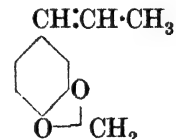
Benzoyl: m.p. 59° .

Phenylurethane: m.p. $121-3^\circ$.

Hirao, *Chem. Abstracts*, 1932, 26, 719.

Kafuku, Ishikawa, Kato, *Chem. Abstracts*, 1929, 23, 1890.

Isosafrol (3:4-Methylenedioxy-1-propenylbenzene)



$\text{C}_{10}\text{H}_{10}\text{O}_2$ MW, 162

Trans:

F.p. $6.7-6.8^\circ$. B.p. $252.4-252.7^\circ/768 \text{ mm.}$, $111-12^\circ/6 \text{ mm.}$, 46.8° in high vacuo. Sol. EtOH , Et_2O , C_6H_6 . $D_4^{20} 1.122$. $n_D^{20} 1.5782$.

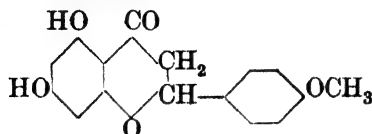
Picrate: m.p. 75° .

Kafuku, *Chem. Abstracts*, 1926, 20, 402.

Priester, *Chem. Abstracts*, 1929, 23, 3304.

Waterman, Priester, *Rec. trav. chim.*, 1928, 47, 1027.

Isosakuranetin (5 : 7-Dihydroxy-4-methoxy-flavanone, kikokunetin)



$C_{16}H_{14}O_5$ MW, 286

Occurs in flowers of *Citrus trifoliata*, Linn.
M.p. 193-4°.

Me ether : $C_{17}H_{16}O_5$. MW, 300. M.p. 117-18°. *Acetyl deriv.* : m.p. 158-60°.

Di-Me ether : $C_{18}H_{18}O_5$. MW, 314. M.p. 117-18°.

Et ether : $C_{18}H_{18}O_5$. MW, 314. M.p. 115°.

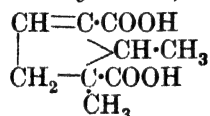
Acetyl deriv. : m.p. 114-15°.

Benzoyl deriv. : m.p. 143°.

Asahina, Inubuse, *Chem. Abstracts*, 1929, 23, 3475.

Hattori, *Chem. Abstracts*, 1930, 24, 1862.

Isosantenenic Acid (3 : 4-Dimethylcyclopentene-2 : 4-dicarboxylic acid)

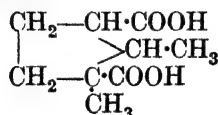


$C_9H_{12}O_4$ MW, 184

Prisms. M.p. 198-9°. Sol. H_2O , EtOH, Et_2O , AcOH. Spar. sol. C_6H_6 , pet. ether.

Enkvist, *J. prakt. Chem.*, 1933, 137, 265, 280.

Isosantenic Acid (cis-Allosantenic acid, 2 : 3-dimethylcyclopentane-1 : 3-dicarboxylic acid)



$C_9H_{14}O_4$ MW, 186

M.p. 121-3°.

Anhydride : $C_9H_{12}O_3$. MW, 168. M.p. 93°.

Komppa, Rohrmann, *Ber.*, 1934, 67, 828.

Enkvist, *J. prakt. Chem.*, 1933, 137, 285.

Isosantenone

$C_9H_{14}O$ MW, 138

Oil. B.p. 185-6°, 89-91°/25 mm.

Oxime : b.p. 155-6°/28 mm.

Semicarbazone : m.p. 175°.

Rimini, *Gazz. chim. ital.*, 1913, 43, ii, 527.

Isosantononic Acid

$C_{25}H_{20}O_4$ MW, 264

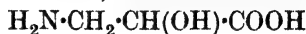
Cryst. from EtOH. M.p. 152°. Spar. sol. H_2O . $[\alpha]_D^{25} - 73.92^\circ$ in $CHCl_3$.

Me ester : $C_{16}H_{22}O_4$. MW, 278. M.p. 69-70°.

Et ester : $C_{17}H_{24}O_4$. MW, 292. M.p. 76°.

Francesconi, *Gazz. chim. ital.*, 1895, 25, ii, 471.

Isoserine (1-Hydroxy-2-aminopropionic acid, 1-hydroxy-β-alanine, 2-aminolactic acid)



$C_3H_7O_3N$ MW, 105

d-.

M.p. 199-201° decomp. $[\alpha]_D^{20} + 32.44^\circ$ in H_2O .

Benzoyl deriv. : m.p. 107-9°. $[\alpha]_D + 29.46^\circ$.

l-.

Cryst. from H_2O . M.p. 199-201° decomp.

Sol. H_2O . $[\alpha]_D^{20} - 32.58^\circ$ in H_2O .

Benzoyl deriv. : m.p. 107-9°. $[\alpha]_D - 30.03^\circ$.

dl-.

Prisms. M.p. 248° decomp. Sol. hot H_2O . Heat of comb. C , 344.5 Cal. $H_2O_2 + FeSO_4 \rightarrow$ aminoacetaldehyde. HNO_2 at 40-50° \rightarrow glyceric acid. k (acid) = 5.37×10^{-10} at 25° : k (base) = 6.03×10^{-12} at 25°.

Et ester : $C_5H_{11}O_3N$. MW, 133. M.p. 75°.

Benzoyl deriv. : m.p. 151°.

Phenylurethane : m.p. 183-4°.

Fischer, Jacobs, *Ber.*, 1907, 40, 1058.

Tomita, Karashima, Nakamura, Nakashima, *Z. physiol. Chem.*, 1932, 211, 38.

Isoserine Aldehyde.

See 1-Hydroxy-2-aminopropionaldehyde.

Isosorbic Acid.

See Isopropylpropionic Acid.

Isosparteine

$C_{15}H_{26}N_2$ MW, 234

B.p. 177.5-179°/16.5 mm.

N-Me : $C_{16}H_{28}N_2$. MW, 248. M.p. 24°. $[\alpha]_D + 23.6^\circ$. *Picrate* : m.p. 203°.

Moureu, Valeur, *Compt. rend.*, 1911, 152, 527.

Isospinasterol

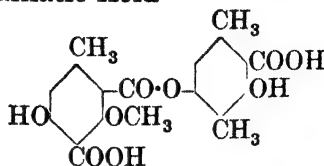
$C_{27}H_{46}O$ MW, 386

M.p. 148-50°. $[\alpha]_D^{23} + 5.2^\circ$.

Chloroacetyl deriv. : m.p. 155-6°.

Hart, Heyl, *J. Biol. Chem.*, 1932, 95, 313.

Isosquamic Acid



$C_{19}H_{18}O_9$ MW, 390

Occurs in *Sphaerophorus globosus*, Wain, and *Cladonia Boryi*, Tuck. Prisms from EtOH. M.p. 227° decomp. Spar. sol. ord. org. solvents. $\text{FeCl}_3 \rightarrow$ violet col. in EtOH.

Asahina, Yanagita, *Ber.*, 1933, 66, 420.

Isostearic Acid (15-Methylheptadecylic acid)



$\text{C}_{18}\text{H}_{36}\text{O}_2$ MW, 284

M.p. 67.6–68.1°.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, 55, 3371.

Isostilbene.

See under Stilbene.

Isostrophanthic Acid

$\text{C}_{23}\text{H}_{32}\text{O}_8$ MW, 436

α -.

M.p. 232–4°.

Mono-Me ester: $\text{C}_{24}\text{H}_{34}\text{O}_8$. MW, 450. Cryst. + $1\text{H}_2\text{O}$. M.p. 235–7° (214°).

Di-Me ester: $\text{C}_{25}\text{H}_{36}\text{O}_8$. MW, 464. M.p. 254–5°. Oxime: m.p. 228° decomp.

β -.

Needles from EtOH.Aq. M.p. 280° decomp. $[\alpha]_D -24^\circ$ in MeOH.

γ -.

M.p. 231–2°. $[\alpha]_D + 90^\circ$ in EtOH.

Di-Me ester: m.p. 227°.

Jacobs, Gustus, *J. Biol. Chem.*, 1927, 74, 818, 829.

Isostrophanthidic Acid

$\text{C}_{23}\text{H}_{30}\text{O}_7$ MW, 418

M.p. 175–80°. $[\alpha]_D -14^\circ$ in EtOH.

Me ester: $\text{C}_{24}\text{H}_{32}\text{O}_7$. MW, 432. M.p. 270–1° decomp. Oxime: m.p. 263°.

Semicarbazone: m.p. 305°.

Jacobs, Elderfield, Grave, Wignall, *J. Biol. Chem.*, 1931, 91, 617.

See also previous reference.

Isostrophanthidine

$\text{C}_{23}\text{H}_{32}\text{O}_6$ MW, 404

Leaflets from MeOH. M.p. 259–61°. After relactonisation, m.p. 274–6°. $[\alpha]_D^{25} + 48^\circ$ in Py.

Benzoyl deriv.: m.p. 270°.

Oxime: m.p. 236°.

Jacobs, Gustus, *J. Biol. Chem.*, 1927, 74, 817.

Isostrophanthonic Acid

$\text{C}_{23}\text{H}_{30}\text{O}_8$ MW, 434

Di-Me ester: $\text{C}_{25}\text{H}_{34}\text{O}_8$. MW, 462. M.p. 250°. Oxime: m.p. 190°. Remelts at 215–17°.

Jacobs, Gustus, *J. Biol. Chem.*, 1931, 92, 342.

Isostrychnic Acid

$\text{C}_{21}\text{H}_{26}\text{O}_4\text{N}_2$ MW, 370

M.p. 231° decomp. Does not form a benzoyl deriv.

Oxford, Perkin, Robinson, *J. Chem. Soc.*, 1927, 2396.

Isostrychnidine

$\text{C}_{21}\text{H}_{24}\text{ON}_2$ MW, 320

Needles + $1\frac{1}{2}\text{H}_2\text{O}$ from H_2O . M.p. 155–7° decomp., anhyd. 163–8°. Sol. MeOH, EtOH, Me_2CO , CHCl_3 , AcOEt, hot C_6H_6 . Spar. sol. pet. ether.

Oxford, Perkin, Robinson, *J. Chem. Soc.*, 1927, 2404.

Isostrychnine

$\text{C}_{21}\text{H}_{22}\text{O}_2\text{N}_2$ MW, 334

Cryst. + $3\text{H}_2\text{O}$. M.p. 220°. Boiling NaOEt \rightarrow isostrychnic acid.

Acetyl deriv.: m.p. 133–4°.

Ciusa, Scagliarini, *Gazz. chim. ital.*, 1924, 54, 202.

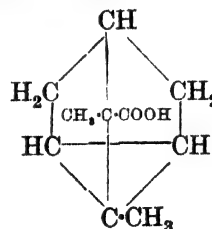
Olivieri-Mandala, *Gazz. chim. ital.*, 1924, 54, 516.

Oxford, Perkin, Robinson, *J. Chem. Soc.*, 1927, 2395.

Isosuccinic Acid.

See Methylmalonic Acid.

Isoteresantalic Acid



$\text{C}_{10}\text{H}_{14}\text{O}_2$ MW, 166

M.p. 142°. B.p. 151–2°/23 mm. $[\alpha]_D^{15} -120.3^\circ$.

Me ester: $\text{C}_{11}\text{H}_{16}\text{O}_2$. MW, 180. B.p. 93.5–94.5°/10 mm.

Asahina, Ishidate, Momose, *Ber.*, 1935, 68, 90, 562.

Isotetracosane

$\text{C}_{24}\text{H}_{50}$ MW, 338

Plates from Et₂O. M.p. 51–51.5°. B.p. 222–5°/9 mm.

Levene, West, *J. Biol. Chem.*, 1914, **18**, 480.

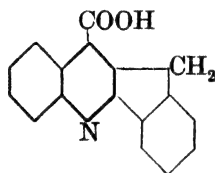
Isotetracosyl Alcohol

C₂₄H₅₀O MW, 354

Cryst. from CHCl₃. M.p. 72°. B.p. 220°/0.8 mm.

See previous reference.

Isotetrophane

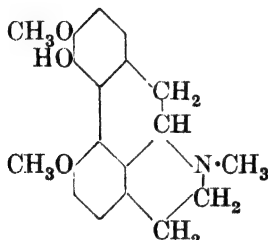


C₁₅H₁₃O₂N MW, 239

M.p. 310°. Insol. ord. org. solvents.

Braun, *Ann.*, 1927, **451**, 53.

Isothebaine



C₁₉H₂₁O₃N MW, 311

Occurs in *Papaver orientale*, Linn. M.p. 203–4°. [α]_D¹⁸ + 285.1° in EtOH.

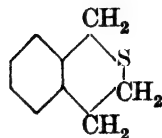
Sulphate : m.p. 120–1° decomp.

Diacetyl deriv. : m.p. 80–5°.

Callow, Gulland, Haworth, *J. Chem. Soc.*, 1929, 1444.

Klee, *Arch. Pharm.*, 1914, **252**, 211.

Isothiochroman (3 : 4-Dihydro-5 : 6-benzothiopyran-2)



C₉H₁₀S MW, 150

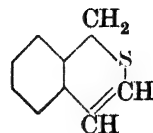
B.p. 128–30°/13 mm.

Methiodide : m.p. 123°.

C₉H₁₀S.HgCl₂ : m.p. 201°.

Braun, Weissbach, *Ber.*, 1929, **62**, 2421.

Isothiochromene



C₉H₈S MW, 148

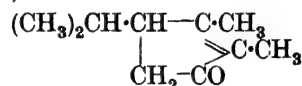
B.p. 124°/13 mm.

Braun, Weissbach, *Ber.*, 1929, **62**, 2422.

Isothiourea.

See Thiourea.

Isothujone (1 : 2-Dimethyl-5-isopropylcyclopentenone-3)



C₁₀H₁₆O MW, 152

B.p. 231–2° (230–1°). D₄²⁰ 0.9282 (0.9305). n_D²⁰ 1.48277.

Oxime : m.p. 119–20°.

Hydrazone : b.p. 152–3°/25 mm., 143–4°/17 mm. D₄²⁰ 0.9579.

Semicarbazone : (a) m.p. 209°. (b) M.p. 184–5°.

Kishner, *Chem. Zentr.*, 1913, I, 706.

Agostinelli, *Gazz. chim. ital.*, 1914, **44**, ii, 112.

Wallach, *Ann.*, 1915, **408**, 168.

Isotrehalose (β : β-Trehalose)

C₁₂H₂₂O₁₁ MW, 342

Cryst. + 4H₂O. M.p. anhyd. 130–5°. [α]_D¹⁷ – 41.5° in H₂O.

Octa-acetyl deriv. : m.p. 181°. [α]_D²⁰ – 18.6° in CHCl₃.

Schlubach, Schetelig, *Z. physiol. Chem.*, 1932, **213**, 83.

Schlubach, Maurer, *Ber.*, 1925, **58**, 1178.

Wrede, *Biochem. Z.*, 1917, **83**, 96.

Isotriacontane (Melissane)

C₃₀H₆₂ MW, 422

Leaflets. M.p. 73–4°. B.p. 222°/0.3 mm.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 533.

Isotricosanic Acid

C₂₃H₄₆O₂ MW, 354

M.p. 73–5°.

Et ester : C₂₅H₅₀O₂. MW, 382. M.p. 55–5°.

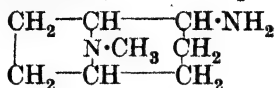
Levene, Taylor, *J. Biol. Chem.*, 1922, **52**, 227.

Isotricosyl Alcohol $C_{23}H_{48}O$

MW, 340

M.p. 69°.

See previous reference.

Isotropylamine (2-Aminotropane) $C_8H_{16}N_2$

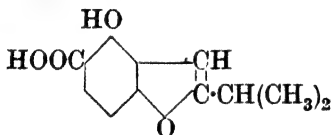
MW, 140

M.p. 8.5°. B.p. 206–7°. Sol. H_2O . B, H_2PtCl_6 : m.p. 261° decomp.

Picrate: m.p. 236–7° decomp.

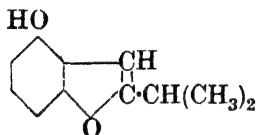
Willstätter, Müller, *Ber.*, 1898, 31, 2661.**Isotruxillic Acid.**

See Truxinic Acid.

Isotubaic Acid (*Rotenic acid, 4-hydroxy-2-isopropylcoumarone-5-carboxylic acid*) $C_{12}H_{12}O_4$

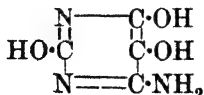
MW, 220

Needles from toluene. M.p. 183° decomp.

Reichstein, Hirt, *Helv. Chim. Acta*, 1933, 16, 129.**Isotubanol** (*Roteol, 4-hydroxy-2-isopropylcoumarone*) $C_{11}H_{12}O_2$

MW, 176

M.p. 37–9°. B.p. about 105°/0.2 mm. Sol. ord. org. solvents.

Reichstein, Hirt, *Helv. Chim. Acta*, 1933, 16, 127.**Isouramil** $C_4H_5O_3N_3$

MW, 143

M.p. above 290°.

5-Acetyl: m.p. above 275°.

Davidson, Bogert, *Chem. Abstracts*, 1932, 26, 4798.**Isourea.**

See Urea.

Isouric Acid.

See Uric Acid.

Isovaleraldehyde (*Isovaleric aldehyde, 2-methylbutyraldehyde*) $(CH_3)_2CH \cdot CH_2 \cdot CHO$ $C_5H_{10}O$

MW, 86

Occurs in orange, bergamot, lemon, sandalwood, citronella, peppermint, eucalyptus, and other oils. B.p. 92.5°. D_{20}^{20} 0.7845. n_D^{20} 1.39023.

Oxime: m.p. 48.5°. B.p. 161.3°/759 mm. (164–5°).

Thiosemicarbazone: m.p. 52–3°.

p-Nitrophenylhydrazone: m.p. 110–11° (107–8°, 101°).

Di-Me acetal: b.p. 128°. D^{15} 0.847.

Di-Et acetal: b.p. 168.2°.

Di-isoamyl acetal: b.p. 240–55°.

Cyanhydrin: see under 1-Hydroxyisocaproic Acid.

Fujita, *Chem. Abstracts*, 1934, 28, 2345.Harries, Oppenheim, *Chem. Abstracts*, 1917, 11, 3237.Sabatier, Mailhe, *Compt. rend.*, 1913, 156, 1731; 1914, 158, 986.Braun, Manz, *Ber.*, 1934, 67, 1710.**Isovaleric Acid** (*Isopropylacetic acid, 2-methylbutyric acid*) $(CH_3)_2CH \cdot CH_2 \cdot COOH$ $C_5H_{10}O_2$

MW, 102

Occurs in tobacco, hop oil, etc. F.p. – 37.6°. B.p. 176.7°. $D_4^{17.8}$ 0.93319. $n_D^{18.4}$ 1.40178. $k = 1.68 \times 10^{-5}$ at 25°. Sol. 23 parts H_2O .Me ester: $C_6H_{12}O_2$. MW, 116. B.p. 116–17°. D_4^{20} 0.8808.Et ester: $C_7H_{14}O_2$. MW, 130. F.p. – 99.3°. B.p. 134.7°. D_4^{20} 0.86565. $n_D^{18.35}$ 1.39738.Propyl ester: $C_8H_{16}O_2$. MW, 144. B.p. 155.5°, 116°/746 mm. $D_4^{17.8}$ 0.8643. $n_D^{17.8}$ 1.40413.Isopropyl ester: b.p. 142°/756 mm. D^{17} 0.8538. n_D 1.397.Isobutyl ester: $C_9H_{18}O_2$. MW, 158. B.p. 170–172°/757.5 mm., 144–3°/381 mm., 105.8°/102 mm., 92°/61 mm. D^{20} 0.8534. $n_D^{19.8}$ 1.40639. sec.-n-Butyl ester: b.p. 163–4°/752 mm. D_4^{20} 0.8482.Isoamyl ester: $C_{10}H_{20}O_2$. MW, 172. B.p. 190–3–190.6°/761 mm., 100°/40 mm. $D_4^{18.7}$ 0.8583. $n_D^{18.7}$ 1.41300.tert.-Amyl ester: b.p. 173–4°. D_0^{14} 0.8608.n-Octyl ester: $C_{13}H_{26}O_2$. MW, 214. B.p. 249–51°. D^{16} 0.8624.Cetyl ester: $C_{21}H_{42}O_2$. MW, 326. M.p. 25°. B.p. 280–90°/202 mm. D^{20} 0.852.

Allyl ester: $C_8H_{14}O_2$. MW, 142. B.p. 162° , $154.5^\circ/767.4$ mm.

Phenyl ester: $C_{11}H_{14}O_2$. MW, 178. B.p. 231° .

Chloride: C_5H_9OCl . MW, 120.5. B.p. $114.5-115.5^\circ/771$ mm. D_4^{25} 0.9854. n_D^{25} 1.41361.

Mono-glyceryl ester: mono-isovalerin. $C_8H_{15}O_4$. MW, 175. B.p. $145-7^\circ/3.5$ mm. D^{16} 1.059.

Di-glyceryl ester: di-isovalerin. $C_{13}H_{24}O_5$. MW, 260. B.p. $170-5^\circ/15$ mm.

Tri-glyceryl ester: see Tri-isovalerin.

Amide: $C_5H_{11}ON$. MW, 101. M.p. 137° .

Anhydride: $C_{10}H_{18}O_3$. MW, 186. B.p. $215.1-215.3^\circ/762$ mm., $103^\circ/15$ mm. D_4^{27} 0.9289. n_D^{25} 1.4147.

Nitrile: isobutyl cyanide. C_5H_9N . MW, 83. F.p. $-100-85^\circ$. B.p. 130.5° , $52.5-53^\circ/50$ mm. D_6^{20} 0.7884.

Anilide: m.p. $109-10^\circ$.

p-Toluidide: m.p. $106-7^\circ$.

1-Naphthalide: m.p. $125-6^\circ$.

Underwood, Gale, *J. Am. Chem. Soc.*, 1934, **56**, 2117.

Schiff, *Ann.*, 1883, **220**, 334.

Auwers, Eisenlohr, *Z. physik. Chem.*, 1913, **83**, 430.

Kirkhof, Korzina, Astrova, *ibid.*, 3713.

Takayama, Oeda, *Chem. Abstracts*, 1932, **26**, 5017.

Okada, D.R.P., 351,329, (*Chem. Abstracts*, 1932, **26**, 975).

Mitchell, Reid, *J. Am. Chem. Soc.*, 1931, **53**, 321.

Hara, Komatsu, *Chem. Abstracts*, 1925, **19**, 3248.

Isovalerooin (2 : 7-Dimethyl-5-octanolone-4, isobutylisovalerylcarbinol)



$C_{10}H_{20}O_2$ MW, 172

B.p. $94-7^\circ/12$ mm. $D_4^{26.5}$ 0.8930. $n_D^{26.5}$ 1.4260.

Oxime: m.p. 128° .

Corson, Benson, Goodwin, *J. Am. Chem. Soc.*, 1930, **52**, 3993.

Isovalerone.

See Di-isobutyl Ketone.

Isovalerophenone (Isobutyl phenyl ketone)



$C_{11}H_{14}O$ MW, 162

B.p. $236.5^\circ/764$ mm., $137-8^\circ/38$ mm. $D_4^{16.4}$ 0.9701. $n_D^{15.3}$ 1.5139.

Oxime: m.p. 72° (64.5°).

Semicarbazone: m.p. 210° ($208-9^\circ$).

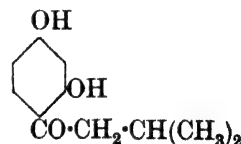
Senderens, *Compt. rend.*, 1910, **150**, 1337.

Tiffeneau, Levy, *Compt. rend.*, 1926, **183**, 969.

4-Isovalerylphenol.

See p-Hydroxyisovalerophenone.

4-Isovalerylresorcinol (Isobutyl 2 : 4-dihydroxyphenyl ketone, 2 : 4-dihydroxyisovalerophenone)



$C_{11}H_{14}O_3$ MW, 194

M.p. $108-10^\circ$. B.p. $183-5^\circ/6-7$ mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1692.

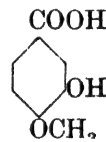
Isovaleryltoluene.

See Isobutyl tolyl Ketone.

Isovaline.

1-Amino-1-methyl-n-butyric Acid, q.v.

Isovanillic Acid (Protocatechuic acid 4-methyl ether, 3-hydroxy-4-methoxybenzoic acid, 3-hydroxy-anisic acid)



$C_8H_8O_4$ MW, 168

Prisms or plates from H_2O . M.p. $255-7^\circ$. Sol. EtOH, Et₂O. Spar. sol. H_2O . Sublimes.

Me ester: $C_9H_{10}O_4$. MW, 182. M.p. $83-4^\circ$. Acetyl: m.p. $87-8^\circ$. Benzoyl: m.p. $101-2^\circ$.

Et ester: $C_{10}H_{12}O_4$. MW, 196. *Et ether*: $C_{12}H_{16}O_4$. MW, 224. M.p. 62° .

Nitrile: $C_8H_7O_2N$. MW, 149. M.p. 124° .

Acetyl: m.p. 116° .

Acetyl: m.p. $206-7^\circ$.

Carbethoxyl: m.p. $185-6^\circ$.

Et ether: 4-methoxy-3-ethoxybenzoic acid.

$C_{10}H_{12}O_4$. MW, 196. M.p. $165-6^\circ$. *Amide*:

$C_{10}H_{13}O_3N$. MW, 195. M.p. $196-7^\circ$.

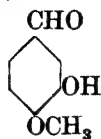
Santos, *Chem. Abstracts*, 1930, **24**, 1647.

Späth, *Monatsh.*, 1920, **41**, 297.

Fischer, Bergmann, Lipschitz, *Ber.*, 1918, **51**, 77.

Späth, Bernhauer, *Ber.*, 1925, **58**, 203.

Isovanillin (*Protocatechuic aldehyde 4-methyl ether, 3-hydroxy-4-methoxybenzaldehyde, 3-hydroxyanisaldehyde*)


 $C_8H_8O_3$

MW, 152

Cryst. from H_2O . M.p. 116–17°. B.p. 179°/15 mm. Sol. EtOH, Et_2O , AcOH, $CHCl_3$, AcOEt, hot H_2O , hot C_6H_6 . Spar. sol. pet. ether, CS_2 .

Oxime: m.p. 146–5°.

Acetyl: m.p. 64°.

Carbomethoxyl: m.p. 121°.

Et ether: $C_{10}H_{12}O_3$. MW, 180. M.p. 50–1°.

Oxime: m.p. 98–9°.

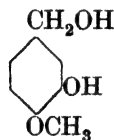
Santos, *Chem. Abstracts*, 1930, **24**, 1647.

de Haen, A.G., D.R.P., 557,547, (*Chem.*

Abstracts, 1933, **27**, 737).

Späth, Bernhauer, *Ber.*, 1925, **58**, 203.

Isovanillyl Alcohol (*3-Hydroxy-4-methoxybenzyl alcohol*)

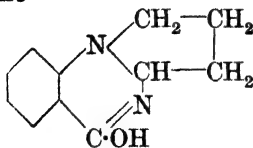

 $C_8H_{10}O_3$

MW, 154

Cryst. from toluene. M.p. 132°. Sol. EtOH, Et_2O , AcOH, toluene, hot H_2O , hot $CHCl_3$, hot C_6H_6 . $FeCl_3 \rightarrow$ green col. Conc. $H_2SO_4 \rightarrow$ red col.

Lock, *Ber.*, 1929, **62**, 1187.

Isovasicine


 $C_{11}H_{12}ON_2$

MW, 188

Cryst. from C_6H_6 -ligroin. M.p. 164° decomp.

Hydrochloride: m.p. 222°.

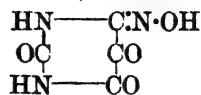
Methiodide: m.p. 191°.

Ghose, Krishna, Narang, Rây, *J. Chem. Soc.*, 1932, 2743.

Isoviolanthrone.

See Isodibenzanthrone.

Isovioluric Acid (*Alloxan-6-oxime*)

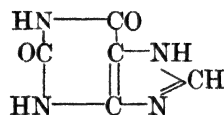

 $C_4H_3O_4N_3$

MW, 157

Yellow cryst. M.p. about 250° decomp.

Davidson, Bogert, *Chem. Abstracts*, 1932, **26**, 4798.

Isoxanthine


 $C_5H_4O_2N_4$

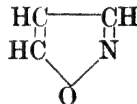
MW, 152

Needles + $\frac{1}{2}H_2O$ from hot H_2O .

Behrend, *Ann.*, 1898, **245**, 223.

Gulland, Holiday, *Nature*, 1933, **132**, 782.

Isoxazole

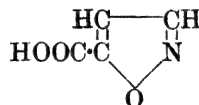

 C_3H_3ON

MW, 69

B.p. 95°. D_4^{20} 1.078. n_D^{20} 1.428.

Auwers, *Ber.*, 1924, **57**, 463.

Isoxazole-5-carboxylic Acid


 $C_4H_3O_3N$

MW, 113

Pale yellow cryst. M.p. 149°. Sublimes.

Me ester: $C_5H_5O_3N$. MW, 127. Oil. B.p. 100–1°/12 mm.

Et ester: $C_6H_7O_3N$. MW, 141. Oil. B.p. 110°/1 mm.

Amide: $C_4H_4O_2N_2$. MW, 112. M.p. 141–2°.

Nitrile: $C_4H_2ON_2$. MW, 94. Oil. B.p. 168°, 75–85°/25 mm.

Anilide: m.p. 107°.

Quilico, Freri, *Gazz. chim. ital.*, 1932, **62**, 440.

Isoxylylic Acid.

See 2: 5-Dimethylbenzoic Acid.

Isyohimbic Acid

 $C_{20}H_{24}O_3N_2$

MW, 340

Cryst. + $1H_2O$ from MeOH.Aq. M.p. 269–70°.

Me ester: see Isyohimbine.

Et ester: $C_{22}H_{28}O_3N_2$. MW, 368. M.p. 202–4°. *Hydrochloride*: m.p. 299–300° decomp.

Wibaut, van Gastel, *Rec. trav. chim.*, 1935, 54, 88.

Isyohimbine (*Isyohimbic acid methyl ester*)

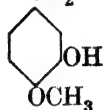
$C_{21}H_{26}O_3N_2$ MW, 354

Cryst. from MeOH.Aq. M.p. 239–40°. $[\alpha]_D^{25} + 108.8^\circ$ in Py.

Hydrochloride: m.p. 298–9° (252–3°).

Wibaut, van Gastel, *Rec. trav. chim.*, 1935, 54, 88.

Isozingerone (*Methyl m-hydroxy-p-methoxy-phenylethyl ketone*, 4-[γ -ketobutyl]-guaiacol)



$C_{11}H_{14}O_3$ MW, 194

M.p. 41–2°. B.p. 159–60°/4 mm.

Oxime: m.p. 121.5–122.5°.

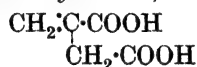
Benzoyl: m.p. 55.5–56.5°. B.p. 235–6°/4 mm.

Semicarbazone: m.p. 140–140.5°.

Murai, *Scientific Reports of the Imperial University, Tokyo*, 1925, 14, 149.

Mannich, Merz, *Arch. Pharm.*, 1927, 265, 15.

Itaconic Acid (*Methylene-succinic acid*, *propylene-2 : 3-dicarboxylic acid*)



$C_5H_6O_4$ MW, 130

M.p. 162–4°. Mod. sol. H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 , $CHCl_3$, CS_2 , ligroin. k (first) = 1.40×10^{-4} at 25°; (second) = 3.56×10^{-6} at 25°. Heat of comb. C_p 475.9 Cal., C_v 477.82 Cal.

Mono-Me ester: $C_6H_8O_4$. MW, 144. M.p. 67°. B.p. 149°/12 mm.

Di-Me ester: $C_7H_{10}O_4$. MW, 158. M.p. 38°. B.p. 208°, 108°/11 mm.

Mono-Et ester: $C_7H_{10}O_4$. MW, 158. M.p. 45°. B.p. 153°/12 mm.

Di-Et ester: $C_9H_{14}O_4$. MW, 186. B.p. 228–9°, 162–3°/35 mm., 111°/13 mm. $D_4^{25} 1.0500$. $n_D^{25} 1.4411$.

Di-active amyl ester: $C_{15}H_{26}O_4$. MW, 270. B.p. 170–2°/10 mm. $[\alpha]_D^{20} + 4.97^\circ$.

Dichloride: $C_5H_4O_2Cl_2$. MW, 167. B.p. 89°/17 mm.

Diamide: $C_5H_8O_2N_2$. MW, 128. M.p. 192°.

Anhydride: $C_5H_4O_3$. MW, 112. M.p. 68° (64–5°). B.p. 139–40°/30 mm.

Anilide: m.p. 190°.

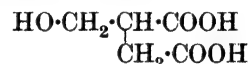
Shriner, Ford, Roll, *Organic Syntheses*, 1931, XI, 70 (*Bibl.*).

Malachowski, Czornodola, *Ber.*, 1935, 68, 367.

Kinoschita, *Chem. Abstracts*, 1932, 26, 966.

Kelly, Segura, *J. Am. Chem. Soc.*, 1934, 56, 2497.

Itamalic Acid (*Hydroxymethylsuccinic acid*, *3-hydroxypyrotartaric acid*)



$C_5H_8O_5$ MW, 148

Does not exist in free state.

Di-Et ester: $C_9H_{16}O_5$. MW, 204. B.p. 150–2°/12 mm.

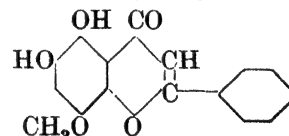
Me ether: $C_6H_{10}O_5$. MW, 162. Needles from Et_2O – C_6H_6 . M.p. 102°. Sol. H_2O , EtOH. Spar. sol. C_6H_6 , $CHCl_3$.

Fittig, Landolt, *Ann.*, 1877, 188, 76.

Wislicenus, Böklen, Reuthe, *Ann.*, 1908, 363, 359.

Simonsen, *J. Chem. Soc.*, 1915, 107, 788.

Izalpinin (5 : 6-*Dihydroxy-8-methoxyflavone*)



$C_{16}H_{12}O_5$ MW, 284

Needles from toluene. M.p. 195°. Mod. sol. Py. Alc. $FeCl_3 \rightarrow$ green col.

Diacetyl deriv.: m.p. 170–1°.

Dibenzoyl deriv.: m.p. 189°.

Di-Me ether: $C_{18}H_{16}O_5$. MW, 312. M.p. 193–5°.

Kimura, Hoshi, *Chem. Zentr.*, 1935, I, 1251.

J

J Acid.

See 2-Amino-5-naphthol-7-sulphonic Acid.

Jalapin (*Scammonin, orizabin*)

$C_{34}H_{56}O_{16}$ MW, 720

Glucoside present in roots of various *Convolvulaceae*. Amorph. powder. M.p. 131°. Very sol. EtOH, amyl alcohol, $CHCl_3$, hot Et_2O , hot MeOH, hot AcOH. Sol. H_2O . Spar. sol. C_6H_6 , CS_2 . Strong purgative and fish poison. Dil. HCl \rightarrow jalapinic acid and sugars, among which *d*-glucose, rhodose and a methyltetrose have been identified.

Mayer, *Ann.*, 1855, 95, 129.

Requier, *J. pharm. chim.*, 1904, 20, 148.

Jalapinic Acid (α -10-Hydroxypalmitic acid)

$CH_3 \cdot [CH_2]_4 \cdot CH(OH) \cdot [CH_2]_9 \cdot COOH$

$C_{16}H_{32}O_3$ MW, 272

Needles from AcOEt. M.p. 68-9° (67-8°). Very sol. EtOH, Et_2O . Insol. H_2O . $[\alpha]_D^{20} + 0.79^\circ$ in $CHCl_3$.

Me ester: $C_{17}H_{34}O_3$. MW, 286. Cryst. from pet. ether. M.p. 40.5-41.5° (47-9°). B.p. 220°/20 mm., 183-6°/3 mm. $[\alpha]_D^{20} + 0.98^\circ$ in $CHCl_3$.

Et ester: $C_{18}H_{36}O_3$. MW, 300. Needles. M.p. 47-8°. *Acetyl*: oil. B.p. 224-5°/50 mm. Very sol. EtOH. Insol. H_2O .

Davies, Adams, *J. Am. Chem. Soc.*, 1928, 50, 1754 (*Bibl.*).

Kromer, *J. prakt. Chem.*, 1898, 57, 448.

Japaconine A

$C_{25}H_{41}O_9N$ MW, 499

B, HCl: prisms from Me_2CO . Aq. M.p. 173-5° decomp. Very sol. H_2O . Sol. MeOH, EtOH, amyl alcohol, AcOEt. Spar. sol. Et_2O , Me_2CO .

Tetra-acetyl deriv.: cryst. from EtOH. M.p. 235-6°. $[\alpha]_D^{18} - 28.9^\circ$ in $CHCl_3$.

Benzoyl deriv.: see Japbenzaconine A.

Majima, Suginomé, Morio, *Ber.*, 1924, 57, 1465 (*Bibl.*).

Japaconine B

$C_{25}H_{41}O_9N$ MW, 499

B, HCl: cryst. from Me_2CO . Aq. M.p. 251-2°. Very hygroscopic.

Tetra-acetyl deriv.: prisms from EtOH. M.p. 228-9°. $[\alpha]_D^{19} - 19.1^\circ$ in EtOH.

Benzoyl deriv.: see Japbenzaconine B.

See previous reference.

Japaconitine A

$C_{34}H_{47}O_{11}N$ MW, 645

Constituent of the alkaloids of the Japanese aconite plant. Rhombic cryst. from EtOH. M.p. 202-3° decomp. Sol. 9 parts MeOH. $[\alpha]_D^{13} + 20.7^\circ$ in $CHCl_3$.

B, HCl: needles + $3\frac{1}{2}H_2O$. M.p. 160-1°, 165-6° anhyd. $[\alpha]_D^{18} - 31.3^\circ$ in H_2O .

B, HBr: cryst. + $3\frac{1}{2}H_2O$. M.p. 155-6°, 172-3° anhyd. $[\alpha]_D^{28} - 27.7^\circ$.

B, HI: m.p. 205-9° decomp.

Chloroaurate: needles. M.p. 159-60° decomp. Sol. 3 parts MeOH.

Perchlorate: m.p. 215-18° decomp.

Triacetyl deriv.: m.p. 191-3° decomp.

Majima, Suginomé, Morio, *Ber.*, 1924, 57, 1462.

Japaconitine A₁

$C_{34}H_{47}O_{11}N$ MW, 645

Rhombic cryst. from MeOH. M.p. 208-9° decomp. Sol. 30 parts MeOH. $[\alpha]_D^{12} + 26.4^\circ$ in $CHCl_3$.

B, HBr: m.p. 172-3° decomp. $[\alpha]_D^{16} - 22.5^\circ$ in H_2O .

Chloroaurate: prisms. M.p. 223-4° decomp.

Perchlorate: m.p. 215-18° decomp.

See previous reference.

Japaconitine B

$C_{34}H_{47}O_{11}N$ MW, 645

Rhombic cryst. from MeOH. M.p. 208-9°. $[\alpha]_D^{11} + 26.9^\circ$. Sol. 31 parts MeOH.

B, HCl: m.p. 108-9° decomp. $[\alpha]_D^{18} - 24.7^\circ$ in H_2O .

B, HBr: m.p. 179.5-180.5° decomp. $[\alpha]_D^{30} - 21.8^\circ$.

B, HI: m.p. 228-31° decomp.

Chloroaurate: prisms. M.p. 235-7° decomp. Sol. 13 parts MeOH.

Perchlorate: m.p. 215-18° decomp.

Triacetyl deriv.: m.p. 196-7° decomp.

See previous reference.

Japanic Acid (*Nonadecane-1:19-dicarboxylic acid*)

$HOOC \cdot [CH_2]_{19} \cdot COOH$

$C_{21}H_{40}O_4$ MW, 356

Cryst. from EtOH or AcOEt. M.p. 112-13°.

Di-Me ester: $C_{23}H_{44}O_4$. MW, 384. Plates from MeOH. M.p. 56–7°.

Ruzicka, Stoll, Schinz, *Helv. chim. Acta*, 1928, 11, 680.

Japbenzaconine A (*Benzoyljapaconine A*)

$C_{32}H_{45}O_{10}N$ MW, 603

Cryst. in rosettes from Et₂O–pet. ether. M.p. 183°. $[\alpha]_D^{25} + 40.16^\circ$.

B,HCl: prisms from H₂O. M.p. 244–5°. $[\alpha]_D^{18} - 29.8^\circ$ in H₂O.

B,HAuCl₄: cryst. from EtOH. M.p. 219°.

Tetra-acetyl deriv.: cryst. from EtOH. M.p. 231–2°.

Majima, Suginomé, Morio, *Ber.*, 1924, 57, 1464 (*Bibl.*).

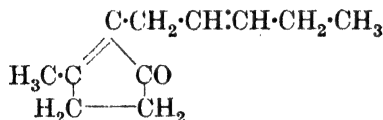
Japbenzaconine B (*Benzoyljapaconine B*)

$C_{32}H_{45}O_{10}N$ MW, 603

B,HCl: plates from H₂O. M.p. 251–2°. $[\alpha]_D^{18} - 24.4^\circ$.

See previous reference.

Jasnone (1-Methyl-2-β-pentenylcyclopentenone-3)



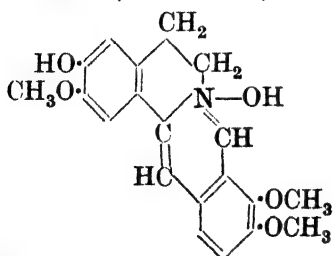
$C_{11}H_{16}O$ MW, 164

Occurs in orange and jasmin leaves. Oil. B.p. 134–5°/12 mm. $D_4^{20} 0.9437$. $n_D^{20} 1.4979$.

Semicarbazone: cryst. from MeOH or EtOH. M.p. 209.5–210°.

Ruzicka, Pfeiffer, *Helv. Chim. Acta*, 1933, 16, 1208.

Jatrorrhizine (*Jateorrhizine*)



$C_{20}H_{21}O_5N$ MW, 355

Constituent of alkaloids of columba root (*Jatrorrhiza columba*). Not known in free state.

Chloride: copper-coloured needles + 1H₂O from EtOH. M.p. 206°.

Iodide: reddish-yellow needles + 1H₂O from EtOH. M.p. 208–10°.

Nitrate: golden yellow needles from EtOH. M.p. 225° decomp.

Späth, Duschinsky, *Ber.*, 1925, 58, 1939.

Feist, *Arch. Pharm.*, 1907, 245, 586.

Feist, Sandstede, *Arch. Pharm.*, 1918, 256, 1.

Jegosapogenin

$C_{35}H_{56}O_6$ MW, 572

Prisms from EtOH. M.p. 286° decomp. Sol. CHCl₃, AcOH. Spar. sol. MeOH, EtOH, Et₂O. Insol. H₂O. Neutral to litmus. Alk. hyd. → tiglic acid + jegosapogenol.

Triacetyl deriv.: needles from MeOH. M.p. 278°. Spar. sol. MeOH.

Tetra-acetyl deriv.: needles from MeOH. M.p. 250–4° decomp. Very sol. Et₂O, hot MeOH.

Tribenzoyl deriv.: needles from EtOH. M.p. 296–9°. Sol. Et₂O. Spar. sol. MeOH, EtOH.

Sone, *Acta Phytochimica*, 1934, 8, 23, (*Chem. Zentr.*, 1935, I, 2539).

Jegosapogenol

$C_{30}H_{50}O_5$ MW, 490

Plates from EtOH. M.p. 329° decomp. Spar. sol. most org. solvents.

Tetra-acetyl deriv.: needles from MeOH. M.p. 205°. Very sol. most org. solvents.

Tetrabenzoyl deriv.: prisms from Me₂CO–Et₂O. M.p. 328°.

See previous reference.

Jegosaponin

$C_{55}H_{80}O_{25}$ MW, 1140

Occurs in shell of fruit of *Styrax japonica* as Ca salt. Colourless needles from MeOH. M.p. 238°. $[\alpha]_D - 39.15^\circ$ in 90% EtOH. Sol. MeOH, EtOH, AcOH. Insol. H₂O, Et₂O, C₆H₆, CHCl₃. Conc. H₂SO₄ → yellow col. changing to red. 5% H₂SO₄ → mixture of jegosapogenine, glucose, and glucuronic acid.

Asahina, Momoya, *Arch. Pharm.*, 1914, 252, 56.

Jervasic Acid.

See Chelidonic Acid.

Jesaconitine

$C_{35}H_{49}O_{19}N$ ($C_{35}H_{51}O_{19}N$) MW, 787 (789)

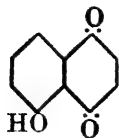
Present in aconite roots. Amorph. M.p. 128–30°.

Triacetyl deriv.: m.p. 213–15°.

B,HAuCl₄: m.p. 208–9°.

B,HClO₄: m.p. 230–2°. $[\alpha]_D - 16.7^\circ$.

Majima, Morio, *Ann.*, 1929, 476, 209.

Juglone (5-Hydroxy-1 : 4-naphthoquinone) $C_{10}H_6O_3$

MW, 174

Present in leaves, etc., of *Juglans regia*, Linn., *Juglans nigra*, Linn., etc. Reddish-yellow needles from $CHCl_3$ or C_6H_6 . M.p. 153–4° after sintering at 144–50°. Volatile in steam. Sublimes. Very sol. $CHCl_3$, hot AcOH. Sol. EtOH, Et₂O. Spar. sol. ligroin. Insol. H₂O. Sol. NaOH to purple sol. Conc. H₂SO₄ → blood red col.

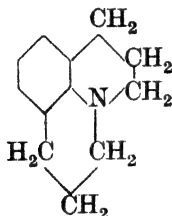
Acetyl: yellow plates from EtOH. M.p. 154–5°. Sublimes. Volatile in steam. Very sol. $CHCl_3$. Sol. C_6H_6 . Spar. sol. EtOH, Et₂O, CS₂, pet. ether. Insol. H₂O.

Monoxime: red needles from EtOH.Aq. M.p. 187–187.5°. Very sol. EtOH, AcOH. Sol. Et₂O. Spar. sol. H₂O.

Dioxime: dark brown needles from AcOH. Explodes at 225°.

Bernthsen, Semper, *Ber.*, 1887, 20, 939.

Willstätter, Wheeler, *Ber.*, 1914, 47, 2798.

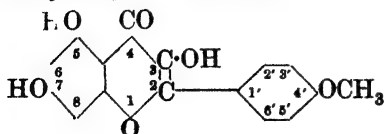
Julolidine $C_{12}H_{15}N$

MW, 173

K Acid.

See 1-Amino-8-naphthol-4 : 6-disulphonic Acid.

Kaempferide (*Kampheride*, *campheride*, 3 : 5 : 7-trihydroxy-4'-methoxyflavone)

 $C_{16}H_{12}O_6$

MW, 300

Present in rhizomes of *Alpinia officinarum*, Hance. Yellow needles + H₂O from EtOH.Aq.

Cryst. M.p. 40°. B.p. 280° decomp., 155–6°/17 mm.

B, HCl: m.p. 218°.

B, HI: m.p. 219–22°.

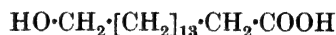
Picrate: m.p. 165°.

Methiodide: cryst. from MeOH. M.p. 186°. Sol. H₂O, EtOH. Insol. Et₂O.

Pinkus, *Ber.*, 1892, 25, 2798.

Braun, Heider, Wyczatkowska, *Ber.*, 1918, 51, 1224.

Juniperic Acid (15-Hydroxypalmitic acid, *juniperinic acid*)

 $C_{16}H_{32}O_3$

MW, 272

Constituent of wax from *Juniperus sabina*, Linn. Cryst. from C_6H_6 -Et₂O. M.p. 95°. Sol. EtOH, hot Et₂O. Spar. sol. cold Et₂O. Insol. cold H₂O.

Me ester: $C_{17}H_{34}O_3$. MW, 286. Cryst. from pet. ether-EtOH. M.p. 55–55.5°. B.p. 194–6°/2 mm.

Acetyl: leaflets from EtOH.Aq. M.p. 63°. B.p. 215–18°/2 mm.

Lactone: dihydro-ambrettolide. Cryst. from EtOH. M.p. 33–4°. B.p. 188°/15 mm. D_4^{20} 0.9348. n_D^{20} 1.4644. Possesses odour of musk.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, 12, 484.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1928, 11, 1171.

Kerschbaum, *Ber.*, 1927, 60, 906.

K

Dehydrates at 130–40°. M.p. 227–9°. Sol. Et₂O, AcOH. Spar. sol. EtOH, $CHCl_3$, C_6H_6 . Insol. H₂O. Sol. conc. H₂SO₄ to yellow sol. Ox. → anisic + oxalic acids. Yellow sols. in alkalis. Alc. FeCl₃ → green col. KOH fusion → phloroglucinol + anisic, oxalic, and formic acids.

Me ether: see Rhamnocitrin.

Di-Me ether: see under Kaempferol.

3 : 7-Di-Et ether: $C_{20}H_{20}O_6$. MW, 356. Yellow needles from MeOH. M.p. 137–9°. Sol. most org. solvents. Insol. H₂O.

Diacetyl deriv.: needles from EtOH. M.p. 188–9°.

Triacetyl: needles from EtOH. M.p. 193–5°. Spar. sol. EtOH. Insol. H₂O.

Dibenzoyl deriv.: yellow needles from C₆H₆-EtOH. M.p. 185–6°.

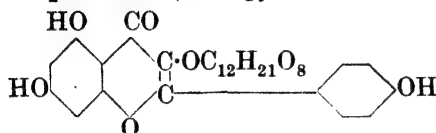
Tribenzoyl: cryst. from AcOH. M.p. 177–8°.

Oesch, Perkin, *J. Chem. Soc.*, 1914, 105, 2350.

Ciamician, Silber, *Ber.*, 1899, 32, 861.

Jahns, *Ber.*, 1881, 14, 2385.

Kaempferitrin (Kaempferol-3-rhamnoside)

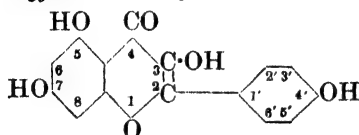


C₂₇H₃₀O₁₄ MW, 578

Glucoside in leaves of *Indigofera arrecta*. Needles + 3½ H₂O. M.p. 190–2°. Sol. hot EtOH. Spar. sol. H₂O. Hyd. → kaempferol + 2 mols. rhamnose.

Tasaki, *Chem. Zentr.*, 1926, I, 957.

Kaempferol (*Kampherol*, *campherol*, 3:5:7:4'-tetrahydroxyflavone, *robigenin*, *rhamnolutin*)



C₁₅H₁₀O₆ MW, 286

Present in *Ranunculaceae*, *Leguminosae*, etc. Yellow needles from EtOH.Aq. M.p. 276–8°. Sol. hot EtOH, Et₂O. Spar. sol. H₂O. Yellow sols. in alkalis. Alc. FeCl₃ → green col. Iron alum → purple col. KOH fusion → phloroglucinol + *p*-hydroxybenzoic acid + acetic acid. Sol. conc. H₂SO₄ with blue fluor. Reduces Fehling's and NH₃.AgNO₃. Gives coloured metallic complexes.

4'-Mono-Me ether: see Kaempferide.

Di-Me ether: see Rhamnocitrin.

Tri-Me ether: kaempferide di-Me ether. C₁₈H₁₆O₆. MW, 328. Yellow needles + 1H₂O from EtOH. M.p. 151–2°. Insol. dil. alkalis. Sol. conc. H₂SO₄ to orange yellow sol. Acetyl: needles from EtOH.Aq. M.p. 190–1°.

4'-Me-3:7-di-Et ether: see under Kaempferide.

Tetra-acetyl: prisms from EtOH. M.p. 181°. Spar. sol. EtOH. Insol. H₂O.

Glucosides: see Kaempferitrin, Robinin, and Multiflorin.

Kostanecki, Lampe, Tambor, *Ber.*, 1904, 37, 2096.

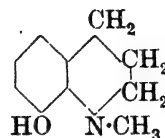
Perkin, Wilkinson, *J. Chem. Soc.*, 1902, 81, 586.

Kostanecki, Rózycki, *Ber.*, 1901, 34, 3723 (Footnote).

Testoni, *Gazz. chim. ital.*, 1900, 30, 334.

Oesch, Perkin, *J. Chem. Soc.*, 1914, 105, 2355.

Kairine (8-Hydroxy-N-methyl-1:2:3:4-tetrahydroquinoline)



C₁₀H₁₃ON MW, 163

B.p. 278–82°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. Alc. FeCl₃ → violet col. Antipyretic.

Me ether: C₁₁H₁₅ON. MW, 177. B.p. 270°. Sol. EtOH, Et₂O. Spar. sol. H₂O. B,HCl: m.p. 150°.

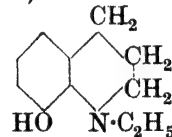
Benzoyl: cryst. from pet. ether. M.p. 58°. B,HCl: m.p. 188°.

p-Nitrobenzoyl: cryst. from Me₂CO. M.p. 128°.

Doebner, Miller, *Ber.*, 1884, 17, 1707.

Pyman, *J. Chem. Soc.*, 1917, 111, 171.

Kairine A (8-Hydroxy-N-ethyl-1:2:3:4-tetrahydroquinoline)



C₁₁H₁₅ON MW, 177

Leaflets from Et₂O or ligroin. M.p. 76°. Sol. EtOH, Et₂O. Spar. sol. ligroin. Insol. H₂O. Alc. FeCl₃ → violet col. Antipyretic.

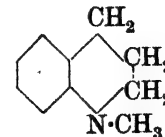
Et ether: C₁₃H₁₉ON. MW, 205. Leaflets from EtOH. M.p. 33°. B.p. 270°. Sol. most org. solvents.

Acetyl: prisms from EtOH. M.p. 63–4°.

Ethiodide: prisms from EtOH. M.p. 160°.

Fischer, Kohn, *Ber.*, 1886, 19, 1046.

Kairoline (N-Methyl-1:2:3:4-tetrahydroquinoline)



C₁₀H₁₃N MW, 147

B.p. 247–50°, 130°/77 mm., 112°/8 mm. D_{20}^{20} 1.022. Characteristic red col. with NaNO_2 .
 $\text{COCl}_2 + \text{AlCl}_3 \rightarrow$ blue col. Antipyretic.

B, HCl : m.p. 100°.

B, HI : m.p. 166–7°.

$B, \text{H}_2\text{PtCl}_6$: m.p. 177°.

Picrate: m.p. 125° (144°).

Methiodide: m.p. 172–4°.

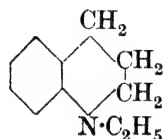
Knorr, *Ber.*, 1899, **32**, 734 (*Footnote*).

Decker, *Ber.*, 1903, **36**, 2570.

Meisenheimer, *Ann.*, 1911, **385**, 138, 153.

Feer, Königs, *Ber.*, 1885, **18**, 2388.

Kairoline A (*N-Ethyl-1 : 2 : 3 : 4-tetrahydroquinoline*)



$\text{C}_{11}\text{H}_{15}\text{N}$

MW, 161

B.p. 257–8°, 135°/16 mm. Sol. EtOH, Et₂O.

Insol. H₂O. Antipyretic.

$B, \text{H}_2\text{PtCl}_6$: m.p. 160°.

Picrate: m.p. 122°.

Methiodide: m.p. 179°.

v. Braun, *Ber.*, 1909, **42**, 2226.

Decker, *Ber.*, 1903, **36**, 2572.

Wagner, *Ber.*, 1880, **13**, 2400.

Kaufmann, Vonderwahl, *Ber.*, 1912, **45**, 1410.

Kalle's Acid.

See 1-Naphthylamine-2 : 7-disulphonic Acid.

Kampherol.

See Kaempferol.

Karitene.

See Illipene.

Katine.

See *d*-Nor-isoephedrine.

Kawaic Acid (2-Methoxy-3-cinnamylidene-crotonic acid, 2-methoxy-6-phenylhexatriene-1-carboxylic acid)



$\text{C}_{14}\text{H}_{14}\text{O}_3$

MW, 230

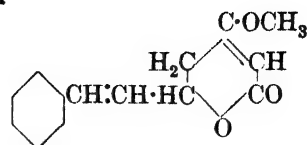
Prisms from Et₂O. M.p. 186° decomp. Sol MeOH, Me₂CO, CHCl_3 , AcOEt. Spar. sol. C₆H₆. Insol. pet. ether. Alc. FeCl₃ → brown col. Sol. conc. H₂SO₄ with purplish-red col. Dil. H₂SO₄ → cinnamylideneacetone. Heat at 190° → 2-methoxy-6-phenylhexatriene-1 : 3 : 5.

Me ester: $\text{C}_{15}\text{H}_{16}\text{O}_3$. MW, 244. Yellow leaflets from MeOH. M.p. 91–2°.

Borsche, Peitzsch, *Ber.*, 1929, **62**, 371.

Borsche, Blount, *Ber.*, 1930, **63**, 2419.

Kawain



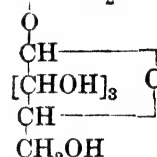
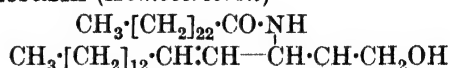
$\text{C}_{14}\text{H}_{14}\text{O}_3$

MW, 230

Occurs in the roots of *Piper methysticum*. Prisms from Et₂O–MeOH. M.p. 106°. B.p. 195–7°/0.1 mm. $[\alpha]_D^{20} + 105^\circ$ in EtOH. Sol. MeOH, Et₂O, Me₂CO. Spar. sol. hexane, pet. ether. Sol. conc. H₂SO₄ to red sol. NaOH → kawaic acid.

Borsche, Peitzsch, *Ber.*, 1930, **63**, 2414.

Kerasin (*Homocerebron*)



$\text{C}_{48}\text{H}_{93}\text{O}_8\text{N}$

MW, 811

One of constituents of nervous tissue. White amorph. powder. M.p. 180° decomp. Anisotropic. $[\alpha]_D - 9^\circ$ in Py– CHCl_3 . Sol. hot EtOH, AcOH, AcOEt, C₆H₆. Spar. sol. Py. Insol. H₂O, Et₂O, pet. ether. Sol. conc. H₂SO₄ to purple sol. Adds Br₂. Gives Molisch test. Hyd. → lignoceric acid + sphingosin + *d*-galactose.

Penta-Me ether: $\text{C}_{53}\text{H}_{103}\text{O}_8\text{N}$. MW, 881. Amorph. powder. M.p. 73°.

Hexas-acetyl deriv.: m.p. 54–6°. $[\alpha]_D^{20} - 16.46^\circ$.

Klenk, Härle, *Z. physiol. Chem.*, 1930, **189**, 243.

Pryde, Humphreys, *Biochem. J.*, 1924, **18**, 661.

Levene, West, *Chem. Abstracts*, 1917, **11**, 2335.

Kessyl Alcohol

$\text{C}_{14}\text{H}_{24}\text{O}_2$

MW, 224

Exists in three modifications.

α -.

Present in *Valeriana officinalis*, Linn. Cryst. from EtOH. M.p. 85°. B.p. 300–2°, 155–6°/11 mm. $[\alpha]_D - 44.72^\circ$ in EtOH. Sol. EtOH, Et₂O, CHCl_3 , C₆H₆, pet. ether. Insol. H₂O. Vanillin + HCl → cherry-red col. HCl → β -form. Ox. → α -kessyl ketone.

Acetyl: m.p. 60–1°. B.p. 280–3°, 157–8°/6.5 mm. $[\alpha]_D - 62.7^\circ$.

Phenylurethane: m.p. 168°.

β -.

Needles from EtOH. M.p. 153°. $[\alpha]_D$ - 17.3°. No col. with vanillin + HCl.

Iso-.

Prisms from EtOH. M.p. 118-19°. Cherry-red col. with vanillin + HCl.

Phenylurethane : m.p. 50-2°.

Asahina, Nakanishi, *Journal of the Pharmaceutical Society, Japan*, 1932, **52**, 1; *Chem. Zentr.*, 1927, I, 429.

Asahina, Hongo, *Chem. Zentr.*, 1924, II, 673.

Kessyl Ketone

$C_{14}H_{24}O_2$ MW, 224

Exists in three modifications.

 α -.

Needles from EtOH. M.p. 105°. Alc. HCl \rightarrow β -form. No col. with vanillin + HCl. Yields two oximes. Red. \rightarrow isokessyl alcohol.

Semicarbazone : m.p. 234-5°.

Oxime : m.p. 153-4°.

"Iso"oxime : m.p. 42°.

 β -.

Needles from EtOH. M.p. 111-12°. No col. with vanillin + HCl.

Semicarbazone : m.p. 190-1°.

Iso-.

Prisms from EtOH. M.p. 56°. $[\alpha]_D$ - 133.5°.

Semicarbazone : m.p. 263-5°.

See above references.

Ketene

$CH_2=CO$

C_2H_2O MW, 42

M.p. - 151°. B.p. - 56° (- 41°). Readily polymerises to 1 : 3-diketocyclobutane. Stable to O. Reacts with hydroxy, amino, hydroxyl-amino, mercapto, etc., groups \rightarrow acetyl derivs. Typical reactions are : $H_2O \rightarrow CH_3 \cdot COOH$: $C_2H_5OH \rightarrow CH_3 \cdot CO \cdot OC_2H_5$: $NH_3 \rightarrow CH_3 \cdot CONH_2$: aniline \rightarrow acetanilide (common method of identifying ketene) : Br in $Et_2O \rightarrow$ bromoacetyl bromide : $H_2O_2 \rightarrow$ peracetic acid + diacetyl peroxide : HCl \rightarrow acetyl chloride : hydroxamic acids \rightarrow dihydroxamic acids. Contrary to general rule reacts with *o*- and *m*-hydroxybenzoic acids (method of preparing aspirin) but not with *p*-hydroxybenzoic acid. Gives Friedel-Crafts reaction with HCl, e.g., veratrole \rightarrow acetoveratrone. Owing to difference in reactivity amino-acids can be acetylated in H_2O . Reacts with organomercurials \rightarrow corresponding Me ketone.

Di-Et acetal : $C_8H_{12}O_2$. MW, 116. B.p. 76-7°. D_4^{20} 0.7932. n_D^{21} 1.3643.

Di-propyl acetal : $C_8H_{16}O_2$. MW, 144. B.p. 104-6°. D_4^{20} 0.7999. n_D^{21} 1.3768.

Di-isobutyl acetal : $C_{10}H_{20}O_2$. MW, 172. B.p. 110-12°. D_4^{20} 0.8145. n_D^{20} 1.3966.

Di-isoamyl acetal : $C_{12}H_{24}O_2$. MW, 200. B.p. 131-3°. D_4^{19} 0.8104. n_D^{13} 1.4021.

Hurd, *Organic Syntheses*, 1932, Collective Vol. I, 324.

Al, *Angew. Chem.*, 1932, **45**, 545.

Staudinger, Klever, *Ber.*, 1908, **41**, 595.

Deakin, Willismore, *J. Chem. Soc.*, 1910, **97**, 1970.

Scheibler, Marhenkel, Nikolic, *Ann.*, 1927, **458**, 28.

Hurd, *J. Am. Chem. Soc.*, 1923, **45**, 3095. van Alphen, *Rec. trav. chim.*, 1924, **43**, 823.

Ploeg, *Rec. trav. chim.*, 1926, **45**, 342.

Gilman, Whoolley, Wright, *J. Am. Chem. Soc.*, 1933, **55**, 2609.

Rice, Greenberg, Waters, Vollrath, *J. Am. Chem. Soc.*, 1934, **56**, 1760.

Ketene.

See 2 : 5-Dimethylpyrazine.

Ketipic Acid (Oxalodiacetic acid, oxalyldiacetic acid, 2 : 3-diketoadipic acid)

$CO \cdot CH_2 \cdot COOH$

$CO \cdot CH_2 \cdot COOH$

$C_6H_6O_6$ MW, 174

Amorph. powder. Decomp. at 150° \rightarrow diacetyl. Sol. conc. HCl, AcOH. Spar. sol. Et_2O . Insol. H_2O , EtOH, $CHCl_3$, CS_2 , C_6H_6 , ligroin. Hot dil. min. acids \rightarrow diacetyl.

Di-Et ester : $C_{10}H_{14}O_6$. MW, 230. Prisms from EtOH. M.p. 76-7° (82-3°). B.p. 220-30°/30 mm. Sol. Et_2O , $CHCl_3$. Spar. sol. EtOH. Insol. H_2O . Hot dil. min. acids \rightarrow diacetyl. Alc. $FeCl_3 \rightarrow$ red col.

Fittig, Daimler, Keller, *Ann.*, 1888, **249**, 183, 190.

Franzen, Schmidt, *Ber.*, 1925, **58**, 224.

Wislicenus, *Ber.*, 1887, **20**, 590.

1-Ketoadipic Acid

$CH_2 \cdot CO \cdot COOH$

$CH_2 \cdot CH_2 \cdot COOH$

$C_6H_8O_5$ MW, 160

Cryst. from Et_2O . M.p. 127°. Sol. H_2O , EtOH, Me_2CO . Spar. sol. Et_2O . Insol. C_6H_6 , $CHCl_3$, pet. ether.

Di-Et ester : $C_{10}H_{16}O_5$. MW, 216. B.p. 157°/16 mm. *Phenylhydrazone* : m.p. 77°.

Semicarbazone: m.p. 118°. *Oxime*: needles. M.p. 52–3°. Spar. sol. H₂O, ligroin.

4-*Et ester-1-nitrile*: C₈H₁₃O₃N. MW, 170. Plates from ligroin. M.p. 74°. Spar. sol. H₂O.

Oxime: 1-oximinoadipic acid, 1-isonitroso-adipic acid. Cryst. M.p. 151–2° decomp. Sol. EtOH. Spar. sol. H₂O, Et₂O, C₆H₆. Ac₂O → 3-cyanobutyric acid. FeCl₃ → brown col.

Semicarbazone: m.p. 210–15°.

Phenylhydrazone: m.p. 141°.

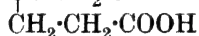
Gault, *Compt. rend.*, 1909, **148**, 1114;

Bull. soc. chim., 1912, **11**, 386.

Dieckmann, *Ber.*, 1900, **33**, 586.

Fischer, Weigert, *Chem. Zentr.*, 1902, **I**, 985.

2-Ketoadipic Acid



MW, 160

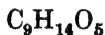
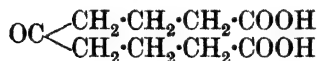
Plates from Me₂CO — CHCl₃. M.p. 124–5°. FeCl₃ → violet col. Semicarbazide → levulinic acid semicarbazone.

1-*Nitrile*: C₆H₇O₃N. MW, 141. Cryst. from CHCl₃. M.p. 86–8°. Sol. most org. solvents. KOH → succinic and acetic acids. HCl → levulinic acid.

Kon, Nangi, *J. Chem. Soc.*, 1932, 2560.

Thiele, Landers, *Ann.*, 1909, **369**, 309.

4-Ketoazelaic Acid (*Acetone-dipropionic acid*)



MW, 202

Exists in two forms. (i) Cryst. from H₂O. M.p. 101–2°. Sol. H₂O, EtOH. Spar. sol. CHCl₃. (ii) Leaflets from H₂O. M.p. 108–9°. Less sol. than (i). NaHg → 4-hydroxyazelaic acid.

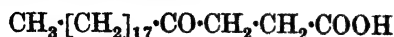
Di-Me ester: C₁₁H₁₈O₅. MW, 230. Leaflets from ligroin. M.p. 30–1°. Sol. EtOH. Spar. sol. H₂O, ligroin. Aq. sol. decomp. on boiling.

Phenylhydrazone: m.p. 151°.

Semicarbazone: prisms from H₂O. M.p. 180–1° decomp. Spar. sol. H₂O, EtOH, Et₂O.

v. Pechmann, Sidgwick, *Ber.*, 1904, **37**, 3817.

3-Ketobehenic Acid (3-Ketoheneicosane-1-carboxylic acid, 3-ketodocosanic acid)

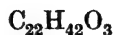


MW, 354

Cryst. from AcOH. M.p. 103°.

Shukow, Schestakow, *Chem. Zentr.*, 1908, **II**, 1415.

9-Ketobehenic Acid (9-Ketoheneicosane-1-carboxylic acid, 9-ketodocosanic acid)

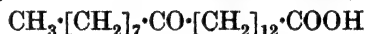


MW, 354

Plates from MeOH. M.p. 94°.

Robinson, Robinson, *J. Chem. Soc.*, 1926, 2207.

13-Ketobehenic Acid (13-Ketoheneicosane-1-carboxylic acid, 13-ketodocosanic acid)



MW, 354

Leaflets from EtOH. M.p. 83–4°. Sol. CHCl₃. Spar. sol. EtOH, C₆H₆. Insol. ligroin.

Me ester: C₂₃H₄₄O₃. MW, 368. Leaflets from EtOH.Aq. M.p. 57–8°.

Et ester: C₂₄H₄₆O₃. MW, 382. Leaflets from EtOH.Aq. M.p. 54°. *Oxime*: m.p. 28–9°. Sol. EtOH, AcOH, Me₂CO, CHCl₃. Spar. sol. H₂O.

Oxime: cryst. from EtOH. M.p. 44–5° (50°). Sol. MeOH, Et₂O, AcOH, CHCl₃. Spar. sol. EtOH.

Azine: cryst. from EtOH. M.p. 56°.

Holt, Baruch, *Ber.*, 1893, **28**, 838.

Baruch, *Ber.*, 1894, **27**, 176.

Fileti, *J. prakt. Chem.*, 1893, **48**, 336.

Ketobutane.

See Methyl ethyl Ketone.

3-Ketobutanol-1.

See 3-Keto-*n*-butyl Alcohol.

Ketobutenylfuran.

See Furfurylideneacetone.

3-Keto-*n*-butyl Alcohol (3-Ketobutanol-1, 1-butanolone-3, acetoethyl alcohol, acetonylcarbinol, methyl 2-hydroxyethyl ketone)



MW, 88

B.p. 109–10°/30 mm., 90°/11 mm. Misc. with H₂O, EtOH, Et₂O. ZnCl₂ → methyl vinyl ketone.

Acetyl: b.p. 125–30°/30 mm. *Semicarbazone*: prisms from MeOH. M.p. 207° decomp.

Oxime: b.p. 125–30°/20 mm.

Bayer, D.R.P., 247,144, (*Chem. Zentr.*, 1912, **II**, 159).

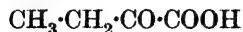
Morgan, Holmes, *J. Chem. Soc.*, 1932, 2669.

3-Keto-1-butylene.

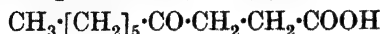
See Methyl vinyl Ketone.

Ketobutylfuran.

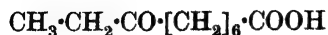
See Furfurylacetoene.

1-Ketobutyric Acid (2-Methylpyruvic acid, propionylformic acid) $\text{C}_4\text{H}_6\text{O}_3$ MW, 102Plates. M.p. 31–32°. B.p. 74–8°/25 mm. n_D^{20} 1.3972. NaHg \rightarrow 1-hydroxybutyric acid.*Me ester*: oxime, cryst. from Et_2O . M.p. 61°. Sol. dil. NaOH.*Et ester*: $\text{C}_6\text{H}_{10}\text{O}_3$. MW, 130. B.p. 162°, 66°/16 mm. D_4^{20} 1.0087. Spar. sol. H_2O .*Oxime*: needles. M.p. 62–3°. B.p. 125–30°/10 mm. Sol. EtOH, Et_2O , C_6H_6 , ligroin. Spar. sol. H_2O .*Amide*: $\text{C}_4\text{H}_7\text{O}_2\text{N}$. MW, 101. Prisms from H_2O . M.p. 116–17°. Sol. H_2O , EtOH. Spar. sol. H_2O . *Oxime*: cryst. from ligroin. M.p. 133–5°.*Di-Et amide*: $\text{C}_6\text{H}_{15}\text{O}_2\text{N}$. MW, 157. B.p. 100°/11 mm. Sol. HCl. α -Semicarbazone: m.p. 140–1°. β -Semicarbazone: m.p. 170–1°. *Phenylhydrazone*: m.p. 101–2°.*Nitrile*: propionyl cyanide. $\text{C}_4\text{H}_5\text{ON}$. MW, 83. B.p. 108–10°. n_D^{20} 1.3225.*Oxime*: cryst. from C_6H_6 . M.p. 167°.*Phenylhydrazone*: cryst. from C_6H_6 -EtOH. M.p. 210°.*Semicarbazone*: cryst. from Me_2CO . M.p. 210°.Barré, *Compt. rend.*, 1927, **184**, 825; *Ann. chim.*, 1928, **9**, 231.Chelintzev, Schmidt, *Ber.*, 1929, **62**, 2210.Claisen, Moritz, *Ber.*, 1880, **13**, 2121.Leperq, *Bull. soc. chim.*, 1894, **11**, 884.Bouveault, Locquin, *Compt. rend.*, 1902, **135**, 181.**2-Ketobutyric Acid.**

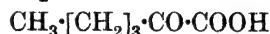
See Acetoacetic Acid.

3-Ketocaproic Acid (2-Heptylpropionic acid) $\text{C}_{10}\text{H}_{18}\text{O}_3$ MW, 186

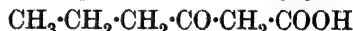
M.p. 70–1°.

Lukes, *Chem. Abstracts*, 1931, **25**, 1485.**7-Ketocaproic Acid (6-Propionyl-n-heptylic acid)** $\text{C}_{10}\text{H}_{18}\text{O}_3$ MW, 186Leaflets. M.p. 64°. Sol. Et_2O . Spar. sol. H_2O .

Dict. of Org. Comp.—II.

Et ester: $\text{C}_{12}\text{H}_{22}\text{O}_3$. MW, 214. B.p. 157°/15 mm.*Semicarbazone*: cryst. from AcOH. M.p. 184°.Blaise, Koehler, *Bull. soc. chim.*, 1910, **7**, 225.**8-Ketocaproic Acid (7-Acetocaprylic acid)** $\text{C}_{10}\text{H}_{18}\text{O}_3$ MW, 186*Et ester*: $\text{C}_{12}\text{H}_{22}\text{O}_3$. MW, 214. B.p. 151–3°/11 mm. *Semicarbazone*: cryst. from EtOH. M.p. 102–3°.Ruzicka, Stoll, *Helv. Chim. Acta*, 1927, **10**, 691.**1-Keto-n-caproic Acid** $\text{C}_6\text{H}_{10}\text{O}_3$ MW, 130

Cryst. M.p. 15°. B.p. 93–4°/14 mm.

Et ester: $\text{C}_8\text{H}_{14}\text{O}_3$. MW, 158. *Oximino deriv.*: cryst. M.p. 57° (42°). B.p. 151–2°/12 mm. *Semicarbazone*: prisms from MeOH. M.p. 149°.*Oximino deriv.*: needles from H_2O . M.p. 131–2°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O . $k = 6.5 \times 10^{-3}$ at 25°. $\text{FeCl}_3 \rightarrow$ red col.*Oxime*: cryst. from EtOH. M.p. 140°.*Phenylhydrazone*: cryst. from EtOH. M.p. 89°.*Semicarbazone*: cryst. from EtOH. M.p. 180°.Kondo, *Biochem. Z.*, 1912, **38**, 409.Hicks, *J. Chem. Soc.*, 1918, **113**, 556.Barré, *Ann. chim.*, 1928, **9**, 235.**2-Keto-n-caproic Acid (Butyrylacetic acid)** $\text{C}_6\text{H}_{10}\text{O}_3$ MW, 130*Me ester*: $\text{C}_7\text{H}_{12}\text{O}_3$. MW, 144. B.p. 85°/14 mm. D_4^{20} 1.037.*Et ester*: $\text{C}_8\text{H}_{14}\text{O}_3$. MW, 158. B.p. 104°/22 mm., 84–8°/10 mm. D_4^{15-65} 0.9862. n_D^{15-2} 1.4300.Bouveault, Bongert, *Bull. soc. chim.*, 1902, **27**, 1088.Wahl, *Compt. rend.*, 1911, **152**, 96.Fischer, Goldschmidt, Nüssler, *Ann.*, 1931, **486**, 31.**3-Keto-n-caproic Acid (Homolevulinic acid, 2-propionylpropionic acid, 4-methyl-levulinic acid)** $\text{C}_6\text{H}_{10}\text{O}_3$ MW, 130Leaflets from Et_2O -pet. ether. M.p. 36–7°. B.p. 183°/20 mm. Sol. H_2O and most org. solvents. Spar. sol. pet. ether. Hygroscopic.

Et ester: b.p. 106°/16 mm. *Semicarbazone*: needles from AcOEt-pet. ether. M.p. 106°.

Semicarbazone: prisms from EtOH. M.p. 176° decomp.

Phenylhydrazone: cryst. M.p. 73°.

Maire, *Bull. soc. chim.*, 1908, 3, 285.

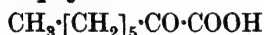
Campbell, Thorpe, *J. Chem. Soc.*, 1910, 97, 1315.

Müller, Feld, *Monatsh.*, 1931, 58, 22.

4-Keto-*n*-caproic Acid.

3-Acetobutyric Acid, *q.v.*

1-Keto-*n*-caprylic Acid



$\text{C}_8\text{H}_{14}\text{O}_3$ MW, 158

Amide: $\text{C}_8\text{H}_{15}\text{O}_2\text{N}$. MW, 157. *Oxime*: needles from H_2O . M.p. 138-9°. Sol. EtOH, Et_2O , C_6H_6 . Insol. ligroin.

v. Miller, Plöchl, *Ber.*, 1893, 26, 1558.

See also Prileschajew, *Ber.*, 1926, 59, 198.

2-Keto-*n*-caprylic Acid.

See Caproylacetic Acid.

3-Keto-*n*-caprylic Acid (2-*n*-Valerylpropionic acid)



$\text{C}_8\text{H}_{14}\text{O}_3$ MW, 158

Cryst. from Et_2O -pet. ether. M.p. 53°. Sol. Et_2O , AcOH. Spar. sol. H_2O .

Me ester: $\text{C}_9\text{H}_{16}\text{O}_3$. MW, 172. B.p. 111°/15 mm.

Et ester: $\text{C}_{10}\text{H}_{18}\text{O}_3$. MW, 186. B.p. 125°/15 mm.

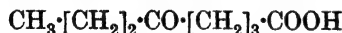
Semicarbazone: cryst. from EtOH. M.p. 153°.

p-Nitrophenylhydrazone: cryst. M.p. 152°.

Blaise, Koehler, *Compt. rend.*, 1909, 148, 490; *Bull. soc. chim.*, 1910, 7, 226.

Lukeš, *Chem. Abstracts*, 1929, 23, 4469.

4-Keto-*n*-caprylic Acid (3-Butyrylbutyric acid)

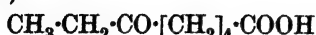


$\text{C}_8\text{H}_{14}\text{O}_3$ MW, 158

Cryst. M.p. 34°. B.p. 280-5°. Insol. H_2O .

Wolfenstein, *Ber.*, 1895, 28, 1464.

5-Keto-*n*-caprylic Acid (4-Propionyl-*n*-valeric acid)



$\text{C}_8\text{H}_{14}\text{O}_3$ MW, 158

Cryst. from H_2O or C_6H_6 -pet. ether. M.p. 52°. B.p. 160-1°/9 mm.

Me ester: $\text{C}_9\text{H}_{16}\text{O}_3$. MW, 172. B.p. 122-3°/14 mm.

Et ester: $\text{C}_{10}\text{H}_{18}\text{O}_3$. MW, 186. B.p. 125°/12 mm. *Semicarbazone*: cryst. from EtOH.Aq. M.p. 88-5°.

Semicarbazone: cryst. from EtOH. M.p. 190°. Insol. H_2O and most org. solvents.

Blaise, Koehler, *Compt. rend.*, 1909, 148, 490; *Bull. soc. chim.*, 1910, 7, 222.

6-Keto-*n*-caprylic Acid (5-Acetocaproic acid)



$\text{C}_8\text{H}_{14}\text{O}_3$ MW, 158

Leaflets. M.p. 29-30°. B.p. 184-5°/15 mm.

Et ester: $\text{C}_{10}\text{H}_{18}\text{O}_3$. MW, 186. B.p. 121-2°/9 mm. D_{20}^{25} 0.9708. n_D^{25} 1.4375.

Semicarbazone: cryst. from AcOH.Aq. M.p. 113-14°.

Kipping, Perkin, *J. Chem. Soc.*, 1889, 55, 338.

Wallach, *Ann.*, 1906, 345, 141.

Lease, McElvain, *J. Am. Chem. Soc.*, 1933, 55, 807.

Ketocoumaran.

See Coumaranone and Isocoumaranone.

Ketocyclobutane.

Cyclobutanone, *q.v.*

Ketocyclodecane.

See Cyclodecanone.

Ketocyclododecane.

See Cyclododecanone.

Ketocycloheptadecane.

Cycloheptadecanone, *q.v.*

Ketocycloheptane.

Cycloheptanone, *q.v.*

Ketocyclohexadecane.

Cyclohexadecanone, *q.v.*

Ketocyclohexane.

Cyclohexanone, *q.v.*

Ketocyclononane.

See Cyclononanone.

Ketocyclo-octadecane.

See Cyclo-octadecanone.

Ketocyclo-octene.

See Granatal.

Ketocyclopentadecane.

Cyclopentadecanone, *q.v.*

Ketocyclopentane.

Cyclopentanone, *q.v.*

Ketocyclotetradecane.

Cyclotetradecanone, *q.v.*

Ketocyclotridecane.

Cyclotridecanone, *q.v.*

Ketocycloundecane.

Cycloundecanone, *q.v.*

Ketodecane.

See Ethyl *n*-heptyl Ketone and Methyl octyl Ketone.

3-Ketodihydroindole.

See Indoxyl.

3-Keto-2 : 6-dimethylheptane.

See Isopropyl isoamyl Ketone.

Ketodimethylhexane.

See Ethyl *tert*.-amyl Ketone and Isopropyl isobutyl Ketone.

Ketodimethylhexene.

See under Homomesitones.

Ketodimethyl-*n*-hexoic Acid.

See Dimethylacetobutyric Acid.

5-Keto-2 : 8-dimethylnonane.

See Isocaprone.

4-Keto-2 : 6-dimethyloctane.

See Isobutyl *active*-amyl Ketone.

2-Keto-1 : 4-diphenylbutane.

See Benzyl phenylethyl Ketone.

4-Keto-1 : 4-diphenylbutane-2-carboxylic acid.

See α -Phenacylhydrocinnamic Acid.

3-Keto-1 : 5-diphenylpentane.

See Dibenzylacetone.

2-Keto-1 : 1-diphenylpropane.

See *unsym.*-Diphenylacetone.

3-Ketododecane.

See Ethyl nonyl Ketone.

Ketoeicosane.

See Ethyl heptadecyl Ketone and *n*-Hexyl *n*-tridecyl Ketone.

10-Ketoeicosane-1 : 20-dicarboxylic Acid

$\text{C}_{22}\text{H}_{40}\text{O}_5$ MW, 384

Di-Me ester: $\text{C}_{24}\text{H}_{44}\text{O}_5$. MW, 412. Cryst from EtOH. M.p. 68–70°. B.p. 240°/0.5 mm.

Ruzicka, Stoll, Schinz, *Helv. Chim. Acta*, 1928, 11, 684.

2-Keto-3-ethylpentane.

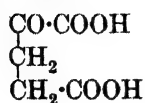
See 3-Ethylpentanone-2.

Ketofluorenol.

See Hydroxyfluorenone.

1-Keto-*d*-gluconic Acid.

See Fructuronic Acid.

1-Ketoglutaric Acid

$\text{C}_5\text{H}_6\text{O}_5$ MW, 146

Cryst. M.p. 115–16°. Alc. $\text{FeCl}_3 \rightarrow$ yellowish-green col.

Di-Et ester: $\text{C}_9\text{H}_{14}\text{O}_5$. MW, 202. B.p. 160°/

23 mm., 144°/13 mm. *Oxime*: needles from H_2O , Et_2O , or C_6H_6 . M.p. 62–3°. *Semicarbazone*: cryst. from EtOH.Aq. M.p. 114°.

Oxime: prisms from H_2O . M.p. 152° decomp. Spar. sol. cold H_2O , Et_2O , C_6H_6 , CHCl_3 .

1-*Nitrile*: $\text{C}_5\text{H}_5\text{O}_3\text{N}$. MW, 127. *Oxime*: prisms from $\text{Et}_2\text{O}-\text{C}_6\text{H}_6$. M.p. 87°. Sol. H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 , CHCl_3 , CS_2 .

Semicarbazone: cryst. from H_2O . M.p. 220°.

Phenylhydrazone: cryst. M.p. 152–3°.

Blaise, Gault, *Bull. soc. chim.*, 1911, 9, 455.

Wislicenus, Waldmüller, *Ber.*, 1911, 44, 1571.

Wislicenus, Grützner, *Ber.*, 1909, 42, 1939.

2-Ketoglutaric Acid.

See Acetone-dicarboxylic Acid.

14-Ketoheptacosane.

See Myristone.

8-Ketoheptadecylic Acid (8-Ketomargaric acid)

$\text{C}_{17}\text{H}_{32}\text{O}_3$ MW, 284

Plates from CHCl_3 -pet. ether. M.p. 78.5°. Sol. CHCl_3 . Mod. sol. EtOH, Et_2O , C_6H_6 , AcOEt. Insol. pet. ether.

Me ester: $\text{C}_{18}\text{H}_{34}\text{O}_3$. MW, 298. Cryst. from MeOH. M.p. 45.5°.

Et ester: $\text{C}_{19}\text{H}_{36}\text{O}_3$. MW, 312. Cryst. from EtOH.Aq. M.p. 38°. Sol. EtOH, Me_2CO , C_6H_6 , CHCl_3 .

Amide: $\text{C}_{17}\text{H}_{33}\text{O}_2\text{N}$. MW, 283. Needles from CHCl_3 -pet. ether. M.p. 119°. Sol. hot H_2O , EtOH, Et_2O , C_6H_6 , CHCl_3 . Insol. pet. ether.

Anilide: cryst. from AcOH. M.p. 96.5°.

Semicarbazone: prisms from Me_2CO . M.p. 111°. Spar. sol. EtOH, Me_2CO , AcOEt. Insol. Et_2O , pet. ether.

Le Sueur, Withers, *J. Chem. Soc.*, 1914, 105, 2806.

6-Ketoheptadiene-2 : 4.

See 2 : 4-Heptadienone-6.

Ketoheptane.

See Butyrone, Ethyl *n*-butyl Ketone, and Methyl *n*-amyl Ketone.

1-Keto-*n*-heptylic Acid (1-Keto- α -nanthylic acid)

$\text{C}_7\text{H}_{12}\text{O}_3$ MW, 144

M.p. 51–2°. Sol. most org. solvents.

Semicarbazone: m.p. 178.5°. Spar. sol. MeOH.

Przewalski, *J. prakt. Chem.*, 1913, 88, 496.

2-Keto-*n*-heptylic Acid (2-Keto-*ænanthylic acid*, *n*-valerylacetic acid)

$\text{C}_7\text{H}_{12}\text{O}_3$ MW, 144

Et ester: $\text{C}_9\text{H}_{16}\text{O}_3$. MW, 172. B.p. 111°/15 mm.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, 33, 1103.

3-Keto-*n*-heptylic Acid (3-Keto-*ænanthylic acid*, 2-butyrylpropionic acid)

$\text{C}_7\text{H}_{12}\text{O}_3$ MW, 144

Plates from pet. ether. M.p. 46–7°. Sol. most org. solvents.

Bouveault, Bongert, *Bull. soc. chim.*, 1902, 27, 1093.

Lukeš, *Chem. Abstracts*, 1929, 23, 4469.

4-Keto-*n*-heptylic Acid (4-Keto-*ænanthylic acid*, 3-propionylbutyric acid)

$\text{C}_7\text{H}_{12}\text{O}_3$ MW, 144

Cryst. from Et_2O –pet. ether. M.p. 50°. Sol. H_2O and most org. solvents. Insol. pet. ether.

Me ester: $\text{C}_8\text{H}_{14}\text{O}_3$. MW, 158. B.p. 101–2°/10 mm.

Et ester: b.p. 116°/14 mm. $\text{NaOEt} \rightarrow$ methylidihydroresorcinol.

Oxime: cryst. from H_2O . M.p. 118°.

Semicarbazone: cryst. from EtOH . M.p. 196°.

p-Nitrophenylhydrazone: m.p. 123°.

Blaise, Maire, *Bull. soc. chim.*, 1908, 3, 424.

5-Keto-*n*-heptylic Acid.

4-Aceto-*n*-valeric Acid, *q.v.*

Ketohexamethylene.

See Cyclohexanone.

Ketohexane.

See Methyl *n*-butyl Ketone and Ethyl propyl Ketone.

Ketohexanol.

See Hexanolone.

Ketohexene.

See Hexenone.

Ketohydrindene.

See Hydrindone.

4-Keto-2-imino-tetrahydroglyoxaline.

See Glycocyamidine.

Ketoidane.

See Hydrindone.

β-Ketoisoamylbenzene.

See Isopropyl benzyl Ketone.

1-Ketoisocaproic Acid (*Isovalerylformic acid*, *isobutyrylglyoxylic acid*, *isopropylpyruvic acid*)

$\text{C}_6\text{H}_{10}\text{O}_3$ MW, 130

M.p. –1.5°. B.p. 84–5°/15 mm.

Et ester: $\text{C}_8\text{H}_{14}\text{O}_3$. MW, 158. B.p. 93°/25 mm., 74°/11 mm. *Oxime*: m.p. 60°. B.p. 142°/12 mm.

Amide: $\text{C}_6\text{H}_{11}\text{O}_2\text{N}$. MW, 129. Cryst. from C_6H_6 . M.p. 60°. Sol. EtOH , Et_2O , CHCl_3 . Insol. pet. ether. *Oxime*: needles from Et_2O . M.p. 146–7°. Sol. hot H_2O , EtOH , Et_2O , AcOH . Spar. sol. C_6H_6 . Insol. pet. ether.

Nitrile: $\text{C}_6\text{H}_9\text{ON}$. MW, 111. B.p. 145–50°. *Oxime*: 1-isonitrosoisocaproic acid, 1-oximinoisocaproic acid. Needles from Et_2O . M.p. 153–5°. $k = 5.6 \times 10^{-4}$ at 25°.

Phenylhydrazone: m.p. 150°.

Semicarbazone: cryst. from EtOH.Aq . M.p. 205°.

v. Miller, Plöchl, *Ber.*, 1893, 26, 1557.

Locquin, *Bull. soc. chim.*, 1904, 31, 1151.

Hübner, *Ann.*, 1864, 131, 74.

Plattner, *Monatsh.*, 1915, 36, 907.

2-Ketoisocaproic Acid (3 : 3-Dimethylacetoacetic acid, *isobutyrylacetic acid*)

$\text{C}_6\text{H}_{10}\text{O}_3$ MW, 130

Free acid exists as unstable syrup.

Et ester: b.p. 93–4°/16 mm., 76–8°/10 mm. D_4^{20} 1.002. Dil. alkalis \rightarrow methyl isopropyl ketone.

Moureu, Delange, *Bull. soc. chim.*, 1903, 29, 668.

Dieckmann, Kron, *Ber.*, 1908, 41, 1270 (Footnote).

9-Ketoisomyristic Acid (9-Keto-11-methyltridecylic acid)

$\text{C}_{14}\text{H}_{26}\text{O}_2$ MW, 226

Cryst. from pet. ether. M.p. 54–5°. Red. \rightarrow isomyristic acid.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, 55, 3371.

9-Ketoisopalmitic Acid (9-Keto-13-methylpentadecylic acid)

$\text{C}_{16}\text{H}_{30}\text{O}_2$ MW, 254

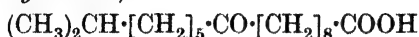
Cryst. from AcOEt. M.p. 68–9°. Does not form semicarbazone. Red. \rightarrow isopalmitic acid.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, **55**, 3370.

Ketoisopentane.

See Methyl isopropyl Ketone.

9-Ketoisostearic Acid (9-Keto-15-methylheptadecylic acid)

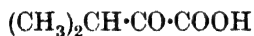


$\text{C}_{18}\text{H}_{34}\text{O}_2$ MW, 282

Cryst. from AcOEt. M.p. 72°. Red. \rightarrow isostearic acid.

See previous reference.

1-Ketoisovaleric Acid (Dimethylpyruvic acid, isobutyrylformic acid, isopropylglyoxylic acid)



$\text{C}_5\text{H}_8\text{O}_3$ MW, 116

Cryst. M.p. 31°. B.p. 170.5°, 65–7°/10 mm. Sol. H_2O , EtOH, Et_2O . D_4^{20} 0.9968. n_D^{16} 1.3850.

Et ester: $\text{C}_7\text{H}_{12}\text{O}_3$. MW, 144. Oil. B.p. 65–9°/15 mm. D_4^{20} 1.031. *Oxime*: needles from Et_2O –pet. ether. M.p. 57°. *Semicarbazone*: needles from Et_2O –pet. ether. M.p. 95–6°. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Amide: $\text{C}_5\text{H}_9\text{O}_2\text{N}$. MW, 115. Plates from Et_2O . M.p. 110°. Sol. Et_2O , CHCl_3 . Spar. sol. H_2O , C_6H_6 . Sublimes.

Nitrile: $\text{C}_5\text{H}_7\text{ON}$. MW, 97. B.p. 116–18°. D_4^{20} 0.9860.

Oxime: plates. M.p. 163–5° decomp.

Phenylhydrazone: cryst. from EtOH. M.p. 143°.

Bouveault, Wahl, *Compt. rend.*, 1901, **132**, 417.

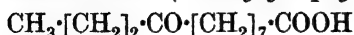
Barger, Ewins, *J. Chem. Soc.*, 1910, **97**, 290.

Sen, *Biochem. J.*, 1923, **143**, 195.

Abderhalden, Rossner, *Z. physiol. Chem.*, 1927, **163**, 264.

Tschelizeff, Schmidt, *Ber.*, 1929, **62**, 2212.

8-Ketolauric Acid (7-Butyrylcapyrylic acid)



$\text{C}_{12}\text{H}_{22}\text{O}_3$ MW, 214

Cryst. M.p. 50°.

Semicarbazone: cryst. M.p. 131°.

Asano, *Chem. Abstracts*, 1924, **18**, 1645.

Ketomalonic Acid.

See Mesoxalic Acid.

Ketomethylcyclohexylacetic Acid.

See Methylcyclohexanone-acetic Acid.

4-Keto-2-methyl-5-ethylheptane.

See Isobutyl sec.-n-amyl Ketone.

Ketomethylethylheptene.

See under Homomesitones.

Ketomethylheptadecylic Acid.

See 9-Ketoisostearic Acid and Lichesterylic Acid.

3-Keto-2-methylheptane.

See Isopropyl butyl Ketone.

Ketomethylheptene.

See 2-Methyl-2-heptenone-6 and under Homomesitones.

Ketomethylhexane.

See Methyl isoamyl Ketone and Methyl active-amyl Ketone.

5-Keto-2-methylhexene-3.

See Isobutyrideneacetone.

Ketomethylnonane.

See Isopropyl n-hexyl Ketone and Isobutyl n-amyl Ketone.

Ketomethylnonene.

See under Homomesitones.

3-Keto-2-methyloctane.

See Isopropyl n-amyl Ketone.

9-Keto-13-methylpentadecylic Acid.

See 9-Ketoisopalmitic Acid.

4-Keto-2-methylpentene-2.

See Mesityl oxide.

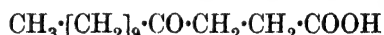
3-Keto-2-methyl-1-phenylbutylene-1.

See Methyl β -methylstyryl Ketone.

9-Keto-11-methyltridecylic Acid.

See 9-Ketoisomyristic Acid.

3-Ketomyristic Acid

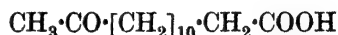


$\text{C}_{14}\text{H}_{26}\text{O}_3$ MW, 242

Plates from pet. ether. M.p. 87°.

Robinson, Robinson, *J. Chem. Soc.*, 1926, 2206; 1930, 747.

12-Ketomyristic Acid



$\text{C}_{14}\text{H}_{26}\text{O}_3$ MW, 242

Et ester: $\text{C}_{16}\text{H}_{30}\text{O}_3$. MW, 270. B.p. 164–6°/1 mm. *Semicarbazone*: cryst. from EtOH. M.p. 105–6°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1927, **10**, 693.

Ketone Musk.

See 2:6-Dinitro-5-tert.-butyl-4-aceto-m-xylene.

9-Ketononadecylic Acid



$\text{C}_{19}\text{H}_{38}\text{O}_3$ MW, 312

Plates from MeOH. M.p. 86–7°.

Amide: $C_{19}H_{37}O_2N$. MW, 311. Plates from MeOH. M.p. 83°.

Robinson, Robinson, *J. Chem. Soc.*, 1926, 2207.

Ketononane.

See cross references under Nonanone.

14-Keto-octacosane-1 : 28-dicarboxylic Acid



$C_{30}H_{56}O_5$ MW, 496

Cryst. from AcOEt. M.p. 101–3°.

Ruzicka, Brugger, Seidel, Schinz, *Helv. Chim. Acta*, 1928, 11, 511.

Keto-octadecane.

See cross references under Octadecanone.

9-Keto-octadecane-1 : 18-dicarboxylic Acid



$C_{28}H_{36}O_5$ MW, 356

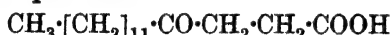
Di-Me ester: $C_{22}H_{40}O_5$. MW, 384. Plates from MeOH. M.p. 59–60°.

Ruzicka, Stoll, Schinz, *Helv. Chim. Acta*, 1928, 11, 677.

Keto-octane.

See Ethyl *n*-amyl Ketone, Methyl *n*-hexyl Ketone, and Propyl *n*-butyl Ketone.

3-Ketopalmitic Acid



$C_{16}H_{30}O_3$ MW, 270

Plates from pet. ether. M.p. 91–2°.

Oxime: needles from pet. ether. M.p. 54°. Sol. org. solvents.

Robinson, Robinson, *J. Chem. Soc.*, 1925, 127, 180.

4-Ketopalmitic Acid



$C_{16}H_{30}O_3$ MW, 270

Plates from MeOH, C_6H_6 , or pet. ether. M.p. 88°.

Robinson, *J. Chem. Soc.*, 1930, 748.

6-Ketopalmitic Acid

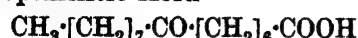


$C_{16}H_{30}O_3$ MW, 270

Plates from MeOH. M.p. 78°.

See previous reference.

7-Ketopalmitic Acid



$C_{16}H_{30}O_3$ MW, 270

Plates from MeOH. M.p. 77–8°.

Bodenstein, *Ber.*, 1894, 27, 3400.

Robinson, *J. Chem. Soc.*, 1930, 749.

8-Ketopalmitic Acid



$C_{16}H_{30}O_3$ MW, 270

Cryst. from AcOEt. M.p. 73.5–74.5°.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, 50, 1754.

9-Ketopalmitic Acid



$C_{16}H_{30}O_3$ MW, 270

Cryst. from AcOEt. M.p. 75–75.8°.

Semicarbazone: cryst. from EtOH. M.p. 154–5°.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, 55, 3370.

10-Ketopalmitic Acid



$C_{16}H_{30}O_3$ MW, 270

Cryst. from AcOEt. M.p. 74–5°.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, 50, 1753.

2-Ketopelargonic Acid (2-Ketononoic acid, *n*-heptylacetacetic acid)



$C_9H_{16}O_3$ MW, 172

Cryst. mass. Decomp. at ord. temp. to methyl hexyl ketone.

Me ester: $C_{10}H_{18}O_3$. MW, 186. B.p. 132–4°/19 mm. D_4^{20} 0.9820.

Et ester: $C_{11}H_{20}O_3$. MW, 200. B.p. 132–3°/13 mm. D_4^{20} 0.9659.

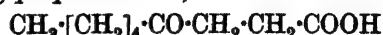
Amide: $C_9H_{17}O_2N$. MW, 171. Leaflets from H_2O . M.p. 106–7°. Alc. $FeCl_3 \rightarrow$ red col.

Nitrile: $C_9H_{15}ON$. MW, 153. B.p. 137–41°/15 mm. Sol. alkalis. $NH_2OH \rightarrow$ 3-hexyl-isoxazolone-imide.

Moureu, Delange, *Bull. soc. chim.*, 1903, 29, 670.

Moureu, Lazennec, *Bull. soc. chim.*, 1907, 1, 1065.

3-Ketopelargonic Acid (3-Ketononoic acid, 2-caproylpropionic acid)



$C_9H_{16}O_3$ MW, 172

M.p. 69–70°.

Lukeš, *Chem. Abstracts*, 1929, 23, 4469.

6-Ketopelargonic Acid (6-Ketonoic acid, 5-propionyl-n-caproic acid)



$\text{C}_9\text{H}_{16}\text{O}_3$ MW, 172

Leaflets from Et_2O -pet. ether. M.p. 42° . Sol. Et_2O , AcOH. Spar. sol. H_2O , pet. ether.

Me ester: $\text{C}_{10}\text{H}_{18}\text{O}_3$. MW, 186. B.p. $143^\circ/21$ mm.

Et ester: $\text{C}_{11}\text{H}_{20}\text{O}_3$. MW, 200. B.p. $153^\circ/21$ mm. *Semicarbazone*: cryst. from Et_2O . M.p. 85° . Sol. EtOH. Spar. sol. Et_2O , C_6H_6 .

Semicarbazone: cryst. from EtOH. M.p. 169° . Spar. sol. EtOH.

Blaise, Koehler, *Bull. soc. chim.*, 1910, 7, 224.

8-Ketopentadecane-1:15-dicarboxylic Acid



$\text{C}_{17}\text{H}_{30}\text{O}_5$ MW, 314

Cryst. from C_6H_6 . M.p. $115-16^\circ$.

Di-Me ester: $\text{C}_{19}\text{H}_{34}\text{O}_5$. MW, 342. Plates. M.p. $57-9^\circ$.

Ruzicka, Brugger, Seidel, Schinz, *Helv. Chim. Acta*, 1928, 11, 504.

10-Ketopentadecylic Acid



$\text{C}_{15}\text{H}_{28}\text{O}_3$ MW, 256

Cryst. from AcOEt. M.p. $70-1^\circ$.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, 50, 1754.

Ketopentane.

See Diethyl Ketone and Methyl propyl Ketone.

2-Keto-1-phenylbutane.

See Ethyl benzyl Ketone.

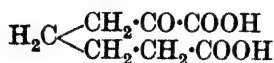
1-Keto-3-phenylbutyric Acid.

See Benzylpyruvic Acid.

3-Keto-5-phenylcaproic Acid.

See 4-Benzyl-levulinic Acid.

1-Ketopimelic Acid



$\text{C}_7\text{H}_{10}\text{O}_5$ MW, 174

Cryst. from CHCl_3 . M.p. $93-4^\circ$. Sol. H_2O , EtOH, Et_2O , Me_2CO , AcOH, AcOEt. Spar. sol. C_6H_6 , pet. ether, toluene, xylene.

Oxime: cryst. from warm H_2O . M.p. 142° decomp.

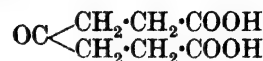
Phenylhydrazone: yellow prisms from AcOH.Aq. M.p. $143-4^\circ$ decomp. Sol. EtOH, Et_2O , AcOEt.

2:4-Dinitrophenylhydrazone: yellow needles from EtOH.Aq. M.p. $190-1^\circ$ decomp.

Semicarbazone: prisms from H_2O . M.p. $196-7^\circ$.

Adickes, *Ber.*, 1925, 58, 213.

3-Ketopimelic Acid (Acetone-diacetic acid, hydrochelidonic acid)



$\text{C}_7\text{H}_{10}\text{O}_5$ MW, 174

Plates or rhombohedra from H_2O . M.p. 143° (138°). Sol. EtOH. Spar. sol. Et_2O , Me_2CO . Insol. C_6H_6 . Heat at m.p. \rightarrow anhydride.

Di-Me ester: $\text{C}_9\text{H}_{14}\text{O}_5$. MW, 202. Needles from EtOH. M.p. 56° . B.p. $276-7^\circ$ decomp.

Sol. EtOH, Et_2O , AcOH, C_6H_6 , CHCl_3 , AcOEt. *Oxime*: needles from CS_2 . M.p. 52° . Sol. EtOH, Et_2O , C_6H_6 , CHCl_3 . Spar. sol. ligroin.

Mono-Et ester: $\text{C}_9\text{H}_{14}\text{O}_5$. MW, 202. Needles from C_6H_6 -ligroin. M.p. $67-8^\circ$. Sol. EtOH, Et_2O , C_6H_6 , CHCl_3 , CS_2 . Insol. ligroin.

Di-Et ester: $\text{C}_{11}\text{H}_{18}\text{O}_5$. MW, 230. Liq. D_{20}^{25} 1.0862. *Oxime*: needles from C_6H_6 -ligroin. M.p. 38° . Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O , ligroin.

Monoamide: $\text{C}_7\text{H}_{11}\text{O}_4\text{N}$. MW, 173. Plates from EtOH. M.p. 127° . Sol. H_2O . Spar. sol. cold EtOH, CHCl_3 . Insol. Et_2O , C_6H_6 , ligroin.

Anhydride: $\text{C}_7\text{H}_8\text{O}_4$. MW, 156. Cryst. from EtOH- CHCl_3 . M.p. 69° ($64-5^\circ$). B.p. $200-5^\circ/15$ mm. Sol. EtOH, Et_2O , Me_2CO , C_6H_6 , CHCl_3 , AcOEt. Spar. sol. H_2O , MeOH, AcOH, CS_2 .

Oxime: prisms from H_2O . M.p. 129° decomp.

Volhard, *Ann.*, 1892, 267, 55, 104; 1889, 253, 221.

Marckwald, *Ber.*, 1888, 21, 1402.

Ketopiperidine.

See Piperidone.

1-Ketopropionaldehyde.

See Pyruvic Aldehyde.

1-Ketopropionic Acid.

See Pyruvic Acid.

2-Ketopropyl Alcohol.

See Hydroxyacetone.

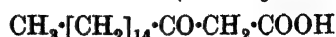
β -Ketopropylbenzene.

See Methyl benzyl Ketone.

Ketopyrrolidine.

See Pyrrolidone.

2-Ketostearic Acid (Palmitylacetic acid)

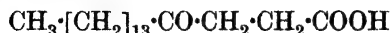


$\text{C}_{18}\text{H}_{34}\text{O}_3$ MW, 298

Et ester: $C_{20}H_{38}O_3$. MW, 326. Cryst. from EtOH. M.p. 37–8°. Alc. $FeCl_3 \rightarrow$ wine-red col.

Helferich, Köster, *Ber.*, 1923, 56, 2090.

3-Ketostearic Acid



$C_{18}H_{34}O_3$ MW, 298

Plates. M.p. 97°. Sol. EtOH, Et_2O , AcOH, Insol. H_2O .

Oxime: cryst. M.p. 85°. Sol. EtOH, Et_2O . Insol. H_2O .

Shukow, Schestakow, *J. prakt. Chem.*, 1903, 67, 418.

5-Ketostearic Acid.

See Lactarinic Acid.

6-Ketostearic Acid



$C_{18}H_{34}O_3$ MW, 298

Plates from EtOH. M.p. 75°. Insol. H_2O .

Arnaud, *Compt. rend.*, 1902, 134, 548.

8-Ketostearic Acid



$C_{18}H_{34}O_3$ MW, 298

Plates from EtOH. M.p. 83°. Spar. sol. pet. ether.

Amide: $C_{18}H_{35}O_2N$. MW, 297. Cryst. from C_6H_6 or MeOH. M.p. 79°.

Behrend, *Ber.*, 1896, 29, 807.

Robinson, Robinson, *J. Chem. Soc.*, 1926, 2206.

9-Ketostearic Acid



$C_{18}H_{34}O_3$ MW, 298

Plates from EtOH. M.p. 76°.

Et ester: $C_{20}H_{38}O_3$. MW, 326. Plates from EtOH. M.p. 41°.

Amide: $C_{18}H_{35}O_2N$. MW, 297. Plates from C_6H_6 -pet. ether. M.p. 80°.

Baruch, *Ber.*, 1894, 27, 174.

Shukow, Schestakow, *J. prakt. Chem.*, 1903, 67, 415.

Robinson, Robinson, *J. Chem. Soc.*, 1926, 2207.

10-Ketostearic Acid



$C_{18}H_{34}O_3$ MW, 298

Cryst. from EtOH-AcOH. M.p. 65°. Sol. EtOH, Et_2O , AcOH.

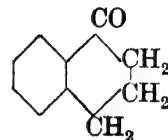
Shukow, Schestakow, *J. prakt. Chem.*, 1903, 67, 416.

Ketosuccinic Acid.

See Oxalacetic Acid.

2-Ketotetrahydroglyoxaline.

See Ethyleneurea.

1-Ketotetrahydronaphthalene (α -Tetralone)

$C_{10}H_{10}O$ MW, 146

B.p. 129.4°/12 mm. D_4^{25} 1.0988. n_D^{25} 1.571. Does not form bisulphite comp.

Oxime: exists in two forms. (i) Needles from MeOH. M.p. 88–9°. Volatile in steam. (ii) Prisms. M.p. 102–3°. Spar. volatile in steam.

Semicarbazone: yellow needles or prisms from EtOH. M.p. 217°. Sol. EtOH, Me_2CO . Spar. sol. $CHCl_3$, AcOEt. Insol. H_2O .

Kipping, Hill, *J. Chem. Soc.*, 1899, 75, 151.

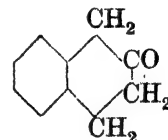
Auwers, *Ann.*, 1918, 415, 162.

Schroeter, *Ann.*, 1921, 426, 88.

Strauss, Rohrbader, *Chem. Abstracts*, 1921, 15, 1897.

Inoue, *Chem. Abstracts*, 1924, 18, 2891.

I.G., E.P., 318,550, (*Chem. Abstracts*, 1930, 24, 2137).

2-Ketotetrahydronaphthalene (β -Tetralone)

$C_{10}H_{10}O$ MW, 146

Cryst. M.p. 18°. B.p. 138°/16 mm. D_4^{25} 1.1055.

Oxime: needles from EtOH.Aq. M.p. 87.5–88°. Sol. hot EtOH, hot C_6H_6 , $CHCl_3$.

Phenylhydrazone: yellow cryst. M.p. 109°.

Semicarbazone: cryst. from EtOH. M.p. 190–1°.

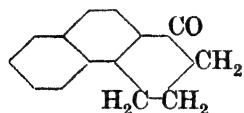
Bamberger, Lodter, *Ann.*, 1895, 288, 114. v. Braun, Braunsdorf, Kirschbaum, *Ber.*, 1922, 55, 3659.

1-Keto-1 : 2 : 3 : 4-tetrahydrophen-anthrene

489

Kojic Acid

1-Keto-1 : 2 : 3 : 4-tetrahydrophen-anthrene



$C_{14}H_{12}O$

MW, 196

Plates from $CHCl_3$ -pet. ether. M.p. 95-6°.
Estrus-exciting comp.

Oxime : m.p. 165-6°.

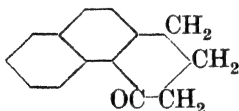
Semicarbazone : m.p. 247° decomp.

Picrate : m.p. 106-7°.

Schroeter, Müller, Huang, *Ber.*, 1929, 62, 654.

Haworth, *J. Chem. Soc.*, 1932, 1130.

4-Keto-1 : 2 : 3 : 4-tetrahydrophen-anthrene



$C_{14}H_{12}O$

MW, 196

Needles from MeOH. M.p. 69°. Estrus-exciting comp.

Oxime : m.p. 172-3°.

Semicarbazone : m.p. 225° decomp.

Picrate : m.p. 101-2°.

See above references.

2-Ketotetrahydroquinoline.

See Hydrocarbostyrl.

Ketotetramethylene.

See Cyclobutanone.

12-Ketotricosane.

See Laurone.

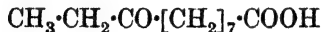
3-Keto-2 : 2 : 4-trimethylpentane.

See Isopropyl tert.-butyl Ketone.

3-Ketoundecane.

See Ethyl octyl Ketone.

8-Ketoundecylic Acid (7-Propionylcaprylic acid)



$C_{11}H_{20}O_3$

MW, 200

Cryst. from pet. ether. M.p. 43-5°.

Myddleton, Barrett, *J. Am. Chem. Soc.*, 1927, 49, 2258.

9-Ketoundecylic Acid (8-Acetopelargonic acid)



$C_{11}H_{20}O_3$

MW, 200

Needles or leaflets from pet. ether. M.p. 59-5°. B.p. 166-7°/1 mm. Sol. most org. solvents. Spar. sol. H_2O .

Et ester : $C_{13}H_{24}O_3$. MW, 228. B.p. 169-70°/12 mm.

Oxime : cryst. from EtOH. M.p. 68-9°.

Semicarbazone : cryst. from EtOH. M.p. 136-5°.

See previous reference and also

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1926, 9, 1084.

3-Ketovaleraldehyde.

See Levulinic Aldehyde.

1-Keto-n-valeric Acid (Butyrylformic acid)



$C_5H_8O_3$

MW, 116

B.p. 179°, 79°/12 mm. Sol. Et_2O , C_6H_6 , $CHCl_3$, ligroin, CS_2 . Mod. sol. H_2O .

Et ester : $C_7H_{12}O_3$. MW, 144. B.p. 179-80°, 70-5°/11 mm. Sol. H_2O . *Oxime* : cryst. M.p. 48°. B.p. 144-5°/16 mm. *Semicarbazone* : needles + C_6H_6 from C_6H_6 -pet. ether. M.p. 139-40°. *Phenylhydrazone* : cryst. M.p. 80-1°.

Isobutyl ester : $C_9H_{16}O_3$. MW, 172. B.p. 87-8°/11 mm. D_4^{20} 0.973. *Oxime* : cryst. M.p. 16°. B.p. 152°/15 mm. *Semicarbazone* : plates + C_6H_6 from C_6H_6 -pet. ether. M.p. 137-8°. *Amide* : $C_5H_9O_2N$. MW, 115. Cryst. from EtOH. M.p. 108°. Sublimes. *Oxime* : needles from Et_2O -ligroin. M.p. 131°. Sol. H_2O , EtOH, Et_2O . Insol. ligroin.

Nitrile : C_5H_7ON . MW, 97. B.p. 133-7°.

Oxime : needles from ligroin. M.p. 145°. Sol. EtOH, C_6H_6 . Spar. sol. H_2O , ligroin. $k = 6.85 \times 10^{-4}$ at 25°.

Semicarbazone : cryst. from EtOH. M.p. 220° decomp.

Phenylhydrazone : cryst. M.p. 101-2°.

p-Nitrophenylhydrazone : cryst. M.p. 205°.

Locquin, *Bull. soc. chim.*, 1904, 31, 1073, 1149.

Blaise, *Compt. rend.*, 1913, 157, 1443.

Barger, Ewins, *J. Chem. Soc.*, 1910, 97, 292.

2-Keto-n-valeric Acid.

See Propionylacetic Acid.

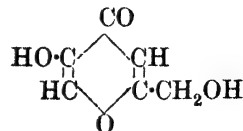
3-Keto-n-valeric Acid.

See Levulinic Acid.

Koch Acid.

See 1-Naphthylamine-3 : 6 : 8-trisulphonic Acid.

Kojic Acid (5-Hydroxy-2-hydroxymethyl-γ-pyrone)



$C_6H_6O_4$

MW, 142

Product of action of *Aspergillus oryzae* on dextrose. Needles. M.p. 152°. Sol. H₂O, EtOH, AcOEt. Mod. sol. Et₂O, CHCl₃, Py. Spar. sol. other solvents. FeCl₃ → blue col. Reduces Fehling's and NH₃·AgNO₃.

Di-Me ether: C₈H₁₀O₄. MW, 170. Cryst. M.p. 90°.

Diacetyl: cryst. M.p. 102°.

Monobenzoyl deriv.: cryst. M.p. 135°.

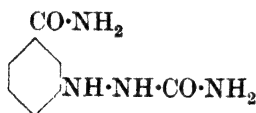
Dibenzoyl: m.p. 136°.

Di-phenylurethane: m.p. 170°.

Yabata, *J. Chem. Soc.*, 1922, 122, 939; 1924, 125, 575.

Verkade, *Rec. trav. chim.*, 1924, 43, 886.

Kryogenin (3-Semicarbazidobenzamide, m-carbamylphenylsemicarbazide)



C₈H₁₀O₂N₃

MW, 180

Cryst. KMnO₄ → brown col. Antipyretic.

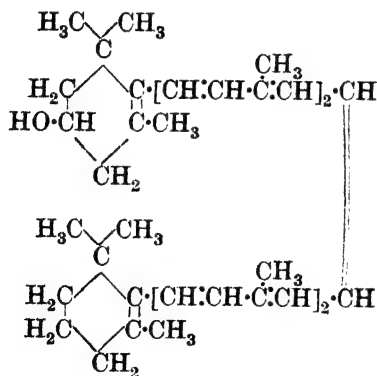
Lumière, Lumière, Chevrotier, *Compt. rend.*, 1902, 135, 188.

Pégurier, *Chem. Zentr.*, 1905, I, 406.

Kryptopyrrole.

Cryptopyrrole, *q.v.*

Kryptoxanthin (*Caricaxanthin*)



C₄₀H₅₆O

MW, 552

Pigment accompanying zeaxanthin in maize, paprika, etc. Reddish-violet prisms from C₆H₆ - MeOH. M.p. 169°. Optically inactive. Absorption maxima in CS₂: 519, 483, 452 mμ. Epiphasic between 90% MeOH and pet. ether. Exhibits Vitamin A activity.

Acetyl: red plates from EtOH-C₆H₆. M.p.

117-18°. Same absorption maxima and phasic properties as kryptoxanthin.

Kuhn, Grundmann, *Ber.*, 1933, 66, 1749.

Karrer, Schlientz, *Helv. Chim. Acta*, 1934, 17, 55.

Kurchenine

C₂₁H₃₂O₂N₂

MW, 334

Alkaloid of *Holarrhena antidysenterica*. Plates from MeOH. M.p. 335-6°. Almost insol. Et₂O. [α]_D²¹ - 92.0° in 2N/HCl.

B, H₂SO₄: cryst. from EtOH. [α]_D - 78.3° in H₂O.

Bertho, v. Schuckmann, Schönberger, *Ber.*, 1933, 66, 789.

Kurchicine

C₂₀H₃₆ON₂

MW, 320

Alkaloid occurring with conessine in Kurchee bark. Needles from CHCl₃-pet. ether. M.p. 175°. [α]_D³² - 11.44° in CHCl₃. Sol. conc. H₂SO₄ to yellow sol. Br in conc. H₂SO₄ → brown ring. Gives white ppt. with Millon's reagent.

B, 2HCl: [α]_D³² - 27.17° in H₂O.

B, 2HBr: m.p. 260°. [α]_D³⁰ - 22.63° in H₂O.

B, 2HI: m.p. 259-60°. [α]_D³² - 22.7° in H₂O.

B, H₂SO₄, 2H₂O: m.p. above 270°. [α]_D²⁹ - 12.72° in H₂O.

B, (COOH)₂: m.p. above 270°.

B, H₂PtCl₆: m.p. 210° decomp.

B, 2HAuCl₄: m.p. 195° decomp.

Ghosh, Bose, *Arch. Pharm.*, 1932, 270, 100.

Kurchine

C₂₃H₃₈N₂

MW, 342

Alkaloid occurring with conessine in Kurchee bark. Needles from EtOH. M.p. 75°. B.p. 233°/1 mm. Sol. conc. H₂SO₄ to yellow sol. Br in conc. H₂SO₄ → purple ring. Gives white ppt. with Millon's reagent. [α]_D²² - 7.57° in CHCl₃.

B, 2HCl, H₂O: m.p. above 270°. [α]_D³² - 0.88° in H₂O.

B, 2HBr: [α]_D²⁹ - 3.08° in H₂O.

B, 2HI: m.p. 275° decomp. [α]_D²⁹ - 7.55° in H₂O.

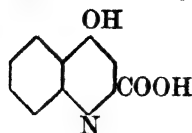
B, H₂SO₄: [α]_D³⁴ - 13.68°.

B, H₂PtCl₆: m.p. above 240°.

B, 2HAuCl₄: m.p. 160-6°.

See previous reference.

Kynurenic Acid (4-Hydroxyquinoline-2-carboxylic acid, 4-hydroxyquinolindinic acid. Keto-form, see γ -Quinolone-2-carboxylic Acid).



$C_{10}H_7O_3N$ MW, 189

Needles. M.p. 282–3°. Sol. hot EtOH. Insol. Et₂O. Sol. to 0.9% in boiling H₂O.

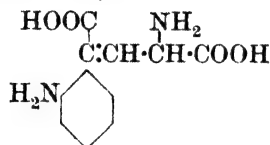
Me ester: $C_{11}H_9O_3N$. MW, 203. M.p. 224°. Forms cryst. hydrochloride.

Me ether: $C_{11}H_9O_3N$. MW, 203. Needles from H₂O. M.p. 196–7° decomp. *Me ester*: $C_{12}H_{11}O_3N$. MW, 217. M.p. 148–9°.

Späth, *Monatsh.*, 1921, **42**, 89.

Besthorn, *Ber.*, 1921, **54**, 1330.

Kynurenine (3-Amino-1-o-aminophenylpropylene-1:3-dicarboxylic acid, 3-amino-1-o-aminophenylglutaconic acid)



$C_{11}H_{12}O_4N_2$ MW, 236

M.p. 190° decomp. with previous sintering. $[\alpha]_D^{17} = -28.5^\circ$.

Kotake, Iwao, *Z. physiol. Chem.*, 1931, **195**, 139.

Toritaka, *Z. physiol. Chem.*, 1934, **226**, 29.

Laccainic Acid

$C_{16}H_{18}O_8$ MW, 332

Occurs in Lac-dye. Brownish-red plates. Decomp. at 180°. Sol. EtOH, Me₂CO, AcOH. Spar. sol. H₂O, Et₂O. Alkalis \rightarrow red col. Reduces NH₃.AgNO₃, but not Fehling's. HNO₃ \rightarrow picric acid.

Schmidt, *Ber.*, 1887, **20**, 1288.

Lacceran.

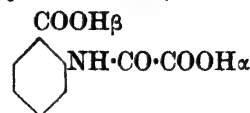
Dotriacontane, *q.v.*

Lacceric Acid (Hentriacontane-1-carboxylic acid)

$CH_3 \cdot [CH_2]_{30} \cdot COOH$ MW, 480

Occurs in wax of *Tachardia lacca* as lacceroi ester. Plates from C₆H₆. M.p. 95–6°.

Kynuric Acid (Oxanilic acid 2-carboxylic acid, o-carboxyoxanilic acid)



$C_9H_7O_5N$ MW, 209

Needles + 1H₂O from H₂O. M.p. 188–90°, anhyd. 200° decomp. Sol. EtOH, Et₂O. Sol. 890 parts H₂O at 10°.

α -*Me ester*: $C_{10}H_9O_5N$. MW, 223. Cryst. from H₂O. M.p. 176.5°. Sol. EtOH, hot H₂O, C₆H₆. Spar. sol. cold H₂O. Insol. CHCl₃, ligroin. β -*Nitrile*: needles from MeOH. M.p. 139°.

α -*Et ester*: $C_{11}H_{11}O_5N$. MW, 237. Cryst. M.p. 184°. β -*Amide*: prisms from EtOH. M.p. 158–9°.

α -*Anilide*: oxanilide 2-carboxylic acid. Needles from EtOH.Aq. M.p. 226–7°.

β -*Nitrile*: 2-cyanoxanilic acid. $C_9H_6O_3N_2$. MW, 190. Needles. M.p. 126°. Sol. EtOH, AcOH, C₆H₆. Spar. sol. Et₂O, pet. ether. *Anilide*: 2-cyanoxanilide. Needles from AcOH. M.p. 197.5°.

Reissert, Grube, *Ber.*, 1909, **42**, 3715.

Kretschy, *Monatsh.*, 1884, **5**, 21.

Bogert, Gortner, *J. Am. Chem. Soc.*, 1910, **32**, 121.

Knape, *J. prakt. Chem.*, 1891, **43**, 228.

Suida, *Monatsh.*, 1911, **32**, 201.

Kynurine.

See 4-Hydroxyquinoline.

L

Et ester: $C_{34}H_{68}O_2$. MW, 508. M.p. 76°. Red. \rightarrow lacceroi.

Gascard, *Compt. rend.*, 1914, **159**, 260.

Lacceroi (Dotriacontanol, 1-hydroxydotriacontane)

$CH_3 \cdot [CH_2]_{30} \cdot CH_2OH$ MW, 466

Occurs as laccerate in lac wax. Plates from C₆H₆. M.p. 89°. Sol. usual org. solvents. Red. \rightarrow dotriacontane. KOH at 250° \rightarrow lacceric acid.

Laccerate: cryst. from C₆H₆. M.p. 94°. Sol. CHCl₃, hot C₆H₆. Insol. EtOH, Et₂O, AcOH.

Gascard, *Ann. chim.*, 1921, **15**, 332; *Compt. rend.*, 1914, **159**, 258.

Laccol

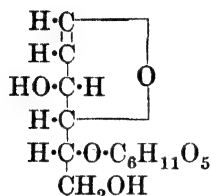


MW, 344

Occurs in Indo-Chinese lac. Thick brown liq.
Di-Me ether: $C_{25}H_{40}O_2$. MW, 372. B.p.
 206–8°/0.25 mm. D_4^{25} 0.92954.

Majima, *Ber.*, 1922, 55, 195.

Lactal (5-Galactosido-glucal)



MW, 308

Needles + H_2O from 90% EtOH. M.p.
 184–6° anhyd. 192–212° decomp. (165–70°
 decomp.). $[\alpha]_D^{18} + 27.66^\circ$. Ox. \rightarrow 5-galacto-
 sidomannose.

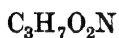
Hexa-acetyl deriv.: m.p. 114°.

Bergmann, Kobel, Schotte, Rennert,
 Ludewig, *Ann.*, 1923, 434, 86.

Fischer, Curme, *Ber.*, 1914, 47, 2051.

See also Watters, Hudson, *J. Am. Chem.*
Soc., 1930, 52, 3472.

Lactamide



MW, 89

d.

M.p. 49–51°. $[\alpha]_D^{18} + 22.2^\circ$.

p-Toluenesulphonyl deriv.: m.p. 105–6°.

r.

Plates from AcOEt. M.p. 75.5°. Sol. H_2O ,
 EtOH.

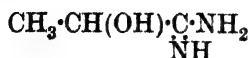
Benzoyl deriv.: m.p. 105–6°.

Et ether: $C_5H_{11}O_2N$. MW, 117. Leaves.
 M.p. 64°. B.p. 219°. Sol. H_2O , EtOH, Et_2O .

Freudenberg, Rhino, *Ber.*, 1924, 57, 1547.

Freudenberg, Brauns, Siegel, *Ber.*, 1923,
 56, 193.

Lactamidine



MW, 88

B,HCl: needles from EtOH. M.p. 171°.

$B_2H_2SO_4$: m.p. 200–2°.

Nitrate: m.p. 84°.

Pinner, *Ber.*, 1890, 23, 2947.

Rule, *J. Chem. Soc.*, 1918, 113, 19.

Lactanilide.

See under Lactic Acid.

Lactarinic Acid (5-Ketostearic acid)



MW, 298

Constituent of *Lactarius rufus*, Scopol. Plates
 from EtOH. M.p. 87°. Sol. Et_2O , CHCl_3 .
 Mod. sol. C_6H_6 . Insol. H_2O .

Et ester: $C_{20}H_{38}O_3$. MW, 326. Cryst. M.p.
 41°. Sol. EtOH, Et_2O .

Oxime: cryst. M.p. 59–61°.

Bougault, Charaux, *Compt. rend.*, 1911,
 153, 572, 880.

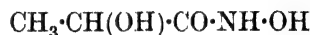
Zellner, *Monatsh.*, 1920, 41, 443.

Robinson, Robinson, *J. Chem. Soc.*, 1925,
 127, 179.

Lacthydrazide.

See under Lactic Acid.

Lacthydroxamic Acid

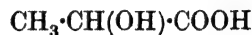


MW, 105

Oil.

Benzoyl deriv.: m.p. 124.5–126.0°.

Jones, Neuffer, *J. Am. Chem. Soc.*, 1917,
 39, 659.

Lactic Acid (1-Hydroxypropionic acid, ethyl-
idene-lactic acid)

MW, 90

d-. Sarcosolactic Acid, Paralactic Acid.

Occurs in juice of muscular tissue, bile, etc.
 Prisms. M.p. 25–6°. $[\alpha]_D^{20} + 3.82^\circ$ in H_2O .
 Vacuum dist. \rightarrow d-lactide. $\text{H}_2\text{SO}_4 \rightarrow$
 $\text{H}\cdot\text{COOH} + \text{CH}_3\cdot\text{CHO}$. Very hygroscopic.

Me ester: $C_4H_8O_3$. MW, 104. Oil. B.p.
 60–1°/35 mm., 58°/19 mm. D_4^{20} 1.0895. $[\alpha]_D^{20}$
 – 8.25°.

Et ester: $C_5H_{10}O_3$. MW, 118. B.p. 69–70°/
 36 mm. D_4^{14} 1.0415. $[\alpha]_D^{14} - 10.33^\circ$. *Acetyl*:
 b.p. 76–8°/15 mm. D_4^{14} 1.0513. $[\alpha]_D^{14} - 49.87^\circ$.

Propyl ester: $C_6H_{12}O_3$. MW, 132. B.p. 122–3°/
 150 mm., 60–1°/10–11 mm. $[\alpha]_D^{20} - 17.06^\circ$.

Butyl ester: $C_7H_{14}O_3$. MW, 146. B.p.
 70–5–73°/10–11 mm.

Isobutyl ester: b.p. 72–3°/13 mm. $[\alpha]_D^{20}$

— 15.4°. *Acetyl*: b.p. 90–1°/12 mm. $[\alpha]_D^{20}$ — 48.5°.

Amyl ester: $C_8H_{16}O_3$. MW, 160. *d.* B.p. 101–2°/17 mm. D_4^{20} 0.9667. $[\alpha]_D^{20}$ — 3.93°. *dl.* B.p. 114–15°/36 mm. D_4^{20} 0.971. $[\alpha]_D^{20}$ — 6.38°.

Me ether: see 1-Methoxypropionic Acid.

Et ether: *d*-1-ethoxypropionic acid. $C_5H_{10}O_3$. MW, 118. Syrup. B.p. 105–6°/16–19 mm. D_4^{20} 1.0395. $[\alpha]_D^{20}$ — 66.36°. *Me ester*: $C_6H_{12}O_3$. MW, 132. B.p. 40–1°/10 mm. D_4^{20} 0.9610. $[\alpha]_D^{20}$ — 81.6°. *Et ester*: $C_7H_{14}O_3$. MW, 146. B.p. 58.5–60°/16–19 mm. D_4^{20} 0.9355. $[\alpha]_D^{20}$ — 79.69°.

l.

Prismatic plates. M.p. 26–7°. Sol. H_2O , EtOH, Et₂O. $[\alpha]_D^{20}$ — 2.26° in H_2O .

Me ester: b.p. 40°/13 mm. D_4^{15} 1.097. $[\alpha]_D^{20}$ + 7.46°. *Acetyl*: b.p. 171–2°, 68–70°/13 mm. $D_4^{19.8}$ 1.0885. $[\alpha]_D^{19.8}$ + 54.28°.

Et ester: b.p. 64–7°/22–25 mm. $[\alpha]_D^{19}$ + 14.52°.

Propyl ester: b.p. 61–3°/11–12 mm. $[\alpha]_D^{19}$ + 12°.

Butyl ester: $[\alpha]_D^{17}$ + 11.7°.

Me ether: see 1-Methoxypropionic Acid.

Et ether: *l*-1-ethoxypropionic acid. $[\alpha]_D^{19}$ + 56.96°.

dl.

Widely distributed in nature. Cryst. M.p. 18°. B.p. 122°/14–15 mm. Volatile in superheated steam. Sol. H_2O , EtOH. Spar. sol. Et₂O. n_D^{20} 1.43915. $k = 1.38 \times 10^{-4}$ at 25° (3.1×10^{-4} at 25°). $H_2O_2 \rightarrow$ acetaldehyde.

Me ester: b.p. 144.8°. D_4^{19} 1.0898.

Et ester: b.p. 154.5°. D_4^{19} 1.0308.

Isopropyl ester: b.p. 166–8°. Sol. H_2O .

l-Menthyl ester: $C_{13}H_{24}O_3$. MW, 228. Needles. M.p. 32°. B.p. 142°/15 mm. $[\alpha]_D^{20}$ — 75.9° in EtOH.

l-Bornyl ester: $C_{13}H_{22}O_3$. MW, 226. B.p. 136°/10 mm. D_4^{20} 1.0370. $[\alpha]_D^{20}$ — 39.3°.

O-Formyl: needles from C_6H_6 . M.p. 78°. B.p. 120–1°/13 mm.

O-Acetyl: see 1-Acetoxypropionic Acid.

O-Chloroacetyl: cryst. from C_6H_6 . M.p. 76°. B.p. 160–2°/15 mm. Sol. hot C_6H_6 .

O-Benzoyl: see *O-Benzoyl-lactic Acid*.

Allophanate: needles. M.p. 190° decomp.

Me ether: see 1-Methoxypropionic Acid.

Et ether: *dl*-1-ethoxypropionic acid. B.p. 195–8° slight decomp., 131–3°/63–8 mm., 97°/11 mm. Sol. H_2O , EtOH, Et₂O. $k = 2.46 \times 10^{-4}$ at 25°. *Et ester*: b.p. 155°, 73°/42 mm. D_4^{20} 0.9446. n_D^{20} 1.40125. Sol. EtOH, Et₂O. Insol. H_2O . *l-Menthyl ester*: $C_{15}H_{28}O_3$. MW,

256. B.p. 140°/13 mm. D_4^{20} 0.9363. $[\alpha]_D^{20}$ — 60.3°. *l-Bornyl ester*: $C_{15}H_{26}O_3$. MW, 254. B.p. 135°/10 mm. D_4^{20} 0.9858. $[\alpha]_D^{20}$ — 33.2°.

Phenyl ether: see 1-Phenoxypropionic acid.

Nitrile: lactonitrile, acetaldehyde cyanhydrin. C_3H_5ON . MW, 71. B.p. 182–4° slight decomp., 102°/30 mm., 90°/17 mm. D_4^{20} 0.9877. $n_D^{18.4}$ 1.40582. Heat of comb. C_v 421.15 Cal. *Et ether*: C_5H_9ON . MW, 99. B.p. 131°/765 mm., 129–30°/730 mm. D_4^{16} 0.878. n_D^{16} 1.390. *Propyl ether*: $C_6H_{11}ON$. MW, 113. B.p. 150°/727 mm. D_4^{20} 0.866. n_D^{20} 1.398.

Amide: see Lactamide.

Amidine: see Lactamidine.

Amidoxime:

$CH_3 \cdot CH(OH) \cdot C(NO_2) \cdot NH_2$. $C_3H_8O_2N_2$. MW, 104. Plates from AcOEt. M.p. 115° (111°). Sol. H_2O , EtOH. Spar. sol. Et₂O, $CHCl_3$. Insol. C_6H_6 , ligroin. Sol. dil. HCl, alkalis, and NH_3 . *Dibenzoyl*: m.p. 131°.

Hydrazide: lacthydrazide. Sol. H_2O , EtOH, AcOEt. Insol. Et₂O, B, HCl : m.p. 149°.

Anilide: lactanilide. $C_9H_{11}O_2N$. MW, 165. Plates from H_2O . M.p. 58.5–59.1°. Sol. EtOH, Et₂O, $CHCl_3$, C_6H_6 . Spar. sol. cold H_2O . Insol. pet. ether. *Et ether*: $C_{11}H_{15}O_2N$. MW, 193. Needles from ligroin. M.p. 62–3°. *O-Acetyl*: needles from H_2O . M.p. 121–2°. *O-Benzoyl*: see under *O-Benzoyl-lactic Acid*.

o-Toluidide: $C_{10}H_{13}O_2N$. MW, 179. Needles from ligroin. M.p. 75–6° (72°). B.p. 254°/44.4 mm.

p-Toluidide: needles from H_2O . M.p. 109° (102–3°).

N-Methylanilide: *N*-lactyl-*N*-methylaniline. $C_{10}H_{13}O_2N$. MW, 179. Prisms or plates from H_2O . M.p. 95–6°.

N-Ethylanilide: *N*-lactyl-*N*-ethylaniline. $C_{11}H_{15}O_2N$. MW, 193. Prisms from H_2O . M.p. 83.5°.

p-Hydroxyanilide: *p*-lactylaminophenol. $C_9H_{11}O_3N$. MW, 181. Cryst. from H_2O . M.p. 137–8°.

p-Anisidide: lactyl-*p*-anisidine. $C_{10}H_{13}O_3N$. MW, 195. Needles from H_2O . M.p. 106.5°.

p-Phenetidide: lactophenin. $C_{11}H_{15}O_3N$. MW, 209. Needles from H_2O . M.p. 118°. Antipyretic and antineuralgic.

1-Naphthalide: $C_{13}H_{13}O_2N$. MW, 215. Prisms from EtOH.Aq. M.p. 108°. *O-Benzoyl*: see under *O-Benzoyl-lactic Acid*.

2-Naphthalide: needles from EtOH.Aq. M.p. 137.5°. *O-Benzoyl*: see under *O-Benzoyl-lactic Acid*.

Guanidine salt: m.p. 161.5–162°.

Quinine salt: m.p. 165.5° decomp.

Brucine salt: cryst. from EtOH. M.p. 210°.

Bischoff, Walden, *Ann.*, 1894, **279**, 71
et seq.

Liebig, *Ann.*, 1847, **62**, 286, 327.

Purdie, Lander, *J. Chem. Soc.*, 1898, **73**,
863, 871.

Wassar, Guye, *Chem. Zentr.*, 1903, **II**,
1419.

Wislicenus, *Ann.*, 1873, **167**, 305.

Purdie, Irvine, *J. Chem. Soc.*, 1899, **75**,
483.

Irvine, *J. Chem. Soc.*, 1906, **89**, 936.

Schreiner, *Ann.*, 1879, **197**, 12.

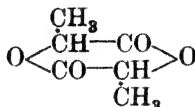
β -Lactic Acid.

See Hydracrylic Acid.

Lactic Aldehyde.

See 1-Hydroxypropionaldehyde.

Lactide (3 : 6 - Diketo - 2 : 5 - dimethyl - 1 : 4 -
dioxan)



$C_6H_8O_4$

MW, 144

d-.

Rhomboids from Et₂O. M.p. 95°. B.p. 150°/
25 mm. Spar. sol. EtOH, Et₂O, C₆H₆, CHCl₃.
[α]_D²⁰ - 298° in C₆H₆.

l-.

Rhomboids from Et₂O. M.p. 95°. B.p. 150°/
25 mm. Spar. sol. Et₂O. [α]_D²⁰ + 281.6° in
C₆H₆.

dl-.

Needles from EtOH. M.p. 124.5°. B.p.
142°/8 mm., 255°/757 mm. Spar. sol. EtOH,
Et₂O.

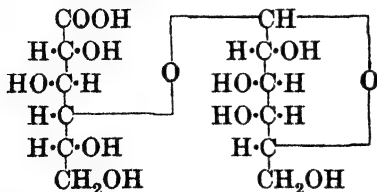
Jungfleisch, Godchot, *Compt. rend.*, 1905,
141, 111.

Wyroubow, *Compt. rend.*, 1905, **141**, 111.

Lactimide.

See 3 : 6-Dimethyl-2 : 5-diketopiperazine.

Lactobionic Acid



$C_{12}H_{22}O_{12}$

MW, 358

Syrup. Sol. H₂O. Spar. sol. EtOH, AcOH.
Insol. Et₂O. Dil. min. acids \rightarrow galactose +
gluconic acid. Hyd. by emulsin and by enzyme

sols. from species of lactose-fermenting yeasts.
Does not reduce Fehling's. Salts sol. H₂O.

$CaA_2 \cdot 5H_2O$: cryst. [α]_D²⁰ + 23.7° in H₂O.

δ -Lactone: cryst. from AcOH. M.p. 1956°-
decomp. [α]_D²⁰ + 54° \rightarrow + 22°.

Me ester of octa-Me ether: b.p. 157-64°/0.05
mm. n_D^{20} 1.4632. Dil. min. acids \rightarrow 2 : 3 : 4 : 6-
tetramethylgalactose + 2 : 3 : 5 : 6-tetramethyl-
 γ -gluconolactone.

Fischer, Meyer, *Ber.*, 1889, **22**, 361.

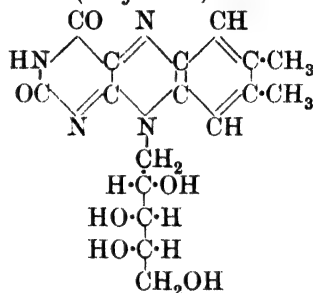
Haworth, Long, *J. Chem. Soc.*, 1927, 546.

Isbell, *Chem. Abstracts*, 1934, **28**, 1667.

Lactobiose.

See Lactose.

Lactoflavine (Ovoflavine, Vitamin B₂)



$C_{17}H_{20}O_6N_4$

MW, 376

Occurs widely distributed in nature. Orange
needles from dil. AcOH. M.p. 271° decomp.
Sol. H₂O. Aq. sol. shows strong green fluor.
[α]_D - 9.80 in H₂O; - 125° in N/20-NaOH.
Absorption maxima: 445, 365, 265, 220 m μ in
H₂O. Physiologically active. Irradiation in
alk. sol. \rightarrow lumiflavine. Irradiation in high
vacuum \rightarrow deuterolactoflavine. NaHSO₃ \rightarrow
leucolactoflavine.

Tetracetyl deriv.: m.p. 246°.

Kuhn, Weygand, *Ber.*, 1934, **67**, 1939.

Wagner-Jauregg, *Angew. Chem.*, 1934, **47**,
318 (*Bibl.*).

Kuhn, Wagner-Jauregg, *Ber.*, 1934, **67**,
1770.

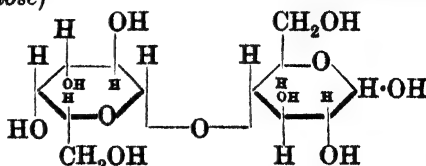
Lactonitrile.

See under Lactic Acid.

Lactophenin.

See under Lactic Acid.

**Lactose (Milk sugar, glucose-4- β -galactoside,
lactobiose)**



$C_{12}H_{22}O_{11}$

MW, 342

Occurs in milk of mammals (human 6-7%, cow 4-5%), but not in plants. Manufactured from whey. Cryst. + H_2O . Loses H_2O at 130° , turns brown at 160° , part. decomp. at 175° with formation of lactocaramel. M.p. 203° decomp.

The anhyd. sugar is hygroscopic and exists in two stereoisomeric forms: α -, m.p. 223° , $[\alpha]_D^{20} + 90^\circ$ in H_2O ; β -, m.p. 252° , $[\alpha]_D^{20} + 35^\circ$ in H_2O . Equilibrium mixture has $[\alpha]_D^{20} + 55.3^\circ$ in H_2O .

Sp. gr. 1.534. Heat of comb. 3953 cal. per gm. Hydrated form sol. 5-6 parts cold H_2O or 2½ parts hot H_2O . Mod. sol. AcOH . Insol. MeOH , EtOH , Et_2O . Exhibits mutarotation. Less sweet than sucrose. Hot min. acids \rightarrow glucose + galactose. More stable than sucrose to hyd. by min. acids. Hyd. by lactase, but not by maltase, invertase or diastase. Undergoes lactic and butyric fermentations. Reduces Fehling's. Br water \rightarrow lactobionic acid. Dil. $\text{HNO}_3 \rightarrow$ mucic and saccharic acids. Conc. $\text{HNO}_3 \rightarrow$ oxalic acid. Dil. $\text{KMnO}_4 \rightarrow$ formic acid. Hot $\text{KMnO}_4 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$. Auto-oxidation in acid sol. \rightarrow levulinic and formic acids. $\text{NaHg} \rightarrow$ dulcitol and sorbitol. $\text{Ac}_2\text{O} + \text{AcONa} \rightarrow$ octa-acetyl deriv. Conc. $\text{KOH} \rightarrow$ lactic acid. KOH fusion \rightarrow oxalic acid.

Phenylosazone: yellow needles. M.p. 200° decomp. Sol. EtOH , hot AcOH , 80 parts hot H_2O . Insol. Et_2O , CHCl_3 , C_6H_6 . Conc. HCl or $\text{C}_6\text{H}_5\text{-CHO} \rightarrow$ lactosone.

p-Nitrophenylosazone: m.p. 258° decomp.

Amylphenylhydrazone: m.p. 123° . $[\alpha]_D^{20} - 8.6^\circ$ in MeOH .

Allylphenylhydrazone: m.p. 132° . $[\alpha]_D^{20} - 14.8^\circ$ in MeOH .

Benzylphenylhydrazone: m.p. 128° . $[\alpha]_D^{20} - 25.7^\circ$ in MeOH .

2-Naphthylhydrazone: m.p. 203° . $[\alpha]_D^{20} 0^\circ$ in MeOH , $+7^\circ$ in AcOH .

Semicarbazone: cryst. + $2\text{H}_2\text{O}$. Loses $1\text{H}_2\text{O}$ at 115° and second H_2O above 120° . M.p. 185° decomp. $[\alpha]_D^{20} + 10.6^\circ$ in H_2O . Sol. H_2O .

Octa-acetyl deriv.: from α -lactose. Needles. M.p. 152° . $[\alpha]_D^{20} + 54^\circ$ in CHCl_3 , $+28.6^\circ$ in C_6H_6 , $+59.9^\circ$ in AcOH . More sol. EtOH , Et_2O than β -form. From β -lactose: cryst. from EtOH . M.p. 90° . $[\alpha]_D^{20} - 4.4^\circ$ in CHCl_3 , -23.5° in C_6H_6 , 0° in AcOH .

Octanitrate: m.p. $145-6^\circ$. $[\alpha]_D^{20} + 74.2^\circ$ in MeOH .

Octaphenylurethane: m.p. $275-80^\circ$.

Hepta-acetyl chlorolactose: (a) probably α -form. Prisms. M.p. $57-9^\circ$. $[\alpha]_D^{20} 76.2^\circ$ in C_6H_6 . Sol. ligroin. (b) Probably β -form. Prisms. M.p. $118-20^\circ$. $[\alpha]_D^{20} 73.5^\circ$ in C_6H_6 . Insol. ligroin.

Hepta-acetylbromolactose: prisms from EtOH . M.p. $143-4^\circ$. $[\alpha]_D^{20} + 104.9^\circ$ in CHCl_3 . Sol. EtOH , Et_2O , CHCl_3 , C_6H_6 . Spar. sol. H_2O . Insol. pet. ether.

Me-lactoside: needles. M.p. 171° . **Hepta-Me ether**: cryst. from pet. ether. M.p. $81-2^\circ$. $n_D 1.4675$. $[\alpha]_D^{20} + 5.19^\circ$ in H_2O , -16.87° in EtOH , -13.04° in MeOH , -13.64° in Me_2CO . **Hepta-acetyl**: m.p. $66-7^\circ$. $[\alpha]_D^{20} - 5.91^\circ$ in CHCl_3 .

Haworth, Long, *J. Chem. Soc.*, 1927, 544.

Haworth, Leitch, *J. Chem. Soc.*, 1918, 113, 188.

Pictet, Vogel, *Helv. Chim. Acta*, 1928, 11, 209.

Gillis, *Rec. trav. chim.*, 1920, 39, 88.

Whittier, *Chemical Reviews*, 1926, 2, 85 (Bibl.).

Lactuceryl

$\text{C}_{30}\text{H}_{50}\text{O}$

MW, 426

Occurs in sap of *Lactuca virosa*. Exists in two forms.

α -.

Needles from EtOH . M.p. 203° ($166-81^\circ$). Sol. Et_2O , CHCl_3 , ligroin. Spar. sol. Me_2CO , AcOH , cold EtOH . $[\alpha]_D^{20} + 76.2^\circ$ in CHCl_3 .

Acetyl deriv.: m.p. $202-7^\circ$.

Propionyl deriv.: m.p. 152° .

Benzoyl deriv.: m.p. 156° .

β -.

Needles from Et_2O or CHCl_3 . M.p. 165° . $[\alpha]_D^{20} + 53.8^\circ$.

Acetyl deriv.: plates. M.p. 230° .

Benzoyl deriv.: m.p. 260° .

Hesse, *Ann.*, 1886, 234, 243; 1888, 244, 270.

Bauer, Schub, *Arch. Pharm.*, 1929, 267, 413.

Lactucol

$\text{C}_{13}\text{H}_{20}\text{O}$

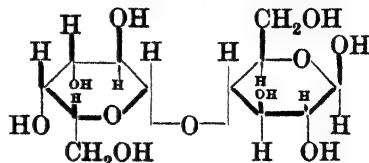
MW, 192

Occurs in *Lactuca sativa* and *L. altissima*. Needles. M.p. $160-2^\circ$.

Acetate: m.p. $198-200^\circ$.

Kassner, *Ann.*, 1887, 238, 224.

Lactulose (d-Galactosido-4-d-fructose)



$\text{C}_{12}\text{H}_{22}\text{O}_{11}$

MW, 342

Plates from MeOH. M.p. 158°. Sol. H₂O. $[\alpha]_D^{25}$ — 23.8°. Exhibits mutarotation. Dil. H₂SO₄ → *d*-galactose + *d*-fructose. Reduces Fehling's.

Anhydro-osazone: m.p. 226° decomp. $[\alpha]_D^{20}$ — 174°.

Montgomery, Hudson, *J. Am. Chem. Soc.*, 1930, 52, 2101.

Ladaniol

C₁₇H₃₀O MW, 250

Constituent of *Cistrus creticus* (Ladanum). Prisms from EtOH. M.p. 89°. Sol. Et₂O, Me₂CO, CHCl₃. Spar. sol. EtOH, H₂O. Sol. conc. H₂SO₄ to reddish-brown sol.

Emmanuel, *Arch. Pharm.*, 1912, 250, 111.

Lævoglucosan.

See β-Glucosan.

Laminarin (*Laminariose*)

(C₆H₁₀O₅)₆ or 7 MW, 972 or 1134

Sugar occurring in the brown algæ, especially the *Laminaria* sub-group. White powder. Darkens slowly at 265°, rapidly at 300°. $[\alpha]_D$ — 11.5°. Sol. H₂O. Insol. EtOH, Et₂O, C₆H₆, pet. ether. Sol. alkalis. Ppts. with Ba, Ca, Sr sols. Hyd. by H₂SO₄ → glucose. Hyd. by snail-juice but not by amylose or emulsin.

Colin, Ricard, *Bull. soc. chim. biol.*, 1930, 12, 88.

Kylin, *Z. physiol. Chem.*, 1915, 94, 337.

Laminariose.

See Laminarin.

Lanoceric Acid

C₃₀H₆₀O₄ MW, 484

Occurs combined in wool-fat. Leaflets from EtOH. M.p. 104–5°. Boiling dil. HCl → anhydride. Spar. sol. Et₂O, C₆H₆. Existence denied by Rohmann.

Anhydride: C₃₀H₅₈O₃. MW, 466. M.p. 86–7°. Sol. C₆H₆. Spar. sol. EtOH.

Darmstädter, Lipschultz, *Ber.*, 1896, 29, 1474.

Rohmann, *Biochem. Z.*, 1916, 77, 298, 321.

Lanolic Acid

C₁₂H₂₂O₃ MW, 214

Cryst. powder. M.p. 75–7°. Insol. H₂O, ligroin.

Marchetti, *Gazz. chim. ital.*, 1895, 25, 43.

Lanolin Alcohol

C₁₂H₂₄O MW, 184

Occurs combined in wool fat. Powder from CHCl₃. M.p. 102–4°. Spar. sol. EtOH, CHCl₃, C₆H₆. Ox. → lanolinic acid.

See previous reference.

Lanopalminic Acid

C₁₆H₃₂O₃ MW, 272

Occurs combined in wool fat. Cryst. from EtOH.Aq. M.p. 87–8°. Sol. most org. solvents. Insol. H₂O, dil. alkalis. After melting, emulsifies with H₂O. Existence denied by Röhmann.

Darmstädter, Lipschultz, *Ber.*, 1896, 29, 2891.

Röhmann, *Biochem. Z.*, 1916, 77, 298, 321.

Lanosterol

C₃₀H₅₀O MW, 426

Occurs in wool fat. Cryst. from MeOH–Me₂CO. M.p. 140–1°. $[\alpha]_D^{25}$ + 58.0° in CHCl₃. Sol. CHCl₃. Spar. sol. Me₂CO, AcOEt, ligroin, cold EtOH. Very spar. sol. MeOH. Not pptd. by digitonin.

Acetyl deriv.: needles. M.p. 113–14°.

Benzoyl deriv.: needles. M.p. 191.5°. $[\alpha]_D^{25}$ + 72.2°.

Bromoacetyl deriv.: needles. M.p. 99–101°.

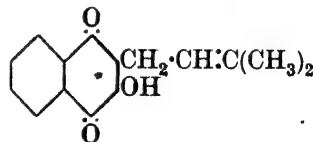
Windaus, Tschesche, *Z. physiol. Chem.*, 1930, 190, 58.

Dorée, Garratt, *J. Soc. Chem. Ind.*, 1933, 52, 141, 355.

Lantanuric Acid.

See Allanturic Acid.

Lapachol(3-Hydroxy-2-[γ-methyl-β-butenyl]-α-naphthoquinone, tecomin, targuic acid)



C₁₅H₁₄O₃ MW, 242

Occurs in lapacho heartwood and various *Bignoniaceæ*. Yellow prisms from EtOH or Et₂O. M.p. 139–40°. Sol. EtOH, AcOH, CHCl₃, C₆H₆. Spar. sol. Et₂O, hot H₂O. Sol. alkalis to red sols. HNO₃ → phthalic acid. Conc. HNO₃ → naphthalene + isobutylene. HCl + AcOH → α-lapachone.

Oxime: yellow needles from EtOH. M.p. 180° decomp. Sol. EtOH.

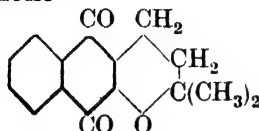
Acetyl: yellow prisms from EtOH. M.p. 82-3°. Sol. Et₂O, hot EtOH. Hyd. by NH₃.

Fieser, *J. Am. Chem. Soc.*, 1927, **49**, 857.

Hooker, *J. Chem. Soc.*, 1896, **69**, 1356.

Paternò, *Gazz. chim. ital.*, 1882, **12**, 343.

Oesterle, *Arch. Pharm.*, 1913, **251**, 301.

 α -Lapachone

C₁₅H₁₄O₃

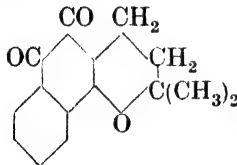
MW, 242

Yellow needles from EtOH. M.p. 117°. Sol. most org. solvents. Spar. sol. H₂O. Insol. alkalis. Spar. volatile in steam. Sol. conc. H₂SO₄ → β -lapachone.

Monoxime: plates from EtOH. M.p. 204° decomp. Sol. conc. H₂SO₄ → β -lapachone monoxime. Sol. 1% NaOH.

Hooker, *J. Chem. Soc.*, 1896, **69**, 1359.

Paternò, *Gazz. chim. ital.*, 1882, **12**, 343.

 β -Lapachone

C₁₅H₁₄O₃

MW, 242

Orange-red needles from EtOH. M.p. 155-6°. Sol. C₆H₆, hot EtOH. Spar. sol. Et₂O. Insol. H₂O, dil. alkalis. HNO₃ → phthalic acid.

Monoxime: orange prisms from EtOH. M.p. 169°. Insol. 1% NaOH.

Phenylhydrazone: orange needles. M.p. 188-9°. Spar. sol. EtOH, Et₂O, AcOH.

Paternò, Minunni, *Gazz. chim. ital.*, 1889, **19**, 614.

See also above references.

Lapathinic Acid

C₂₀H₁₈O₁₄

MW, 482

Constituent of the root of *Rumex obtusifolius*. Prisms from Et₂O. M.p. 228-9° decomp. Sol. H₂O, EtOH, Et₂O. AcOH. Insol. CHCl₃, pet. ether. Yellow sols in alkalis. Sol. conc. H₂SO₄ to colourless sol. Reduces NH₃.AgNO₃. FeCl₃ → green col.

Tschirch, Weil, *Arch. Pharm.*, 1912, **250**, 30.

Dict. of Org. Comp.—II.

Lapodin

C₁₈H₁₆O₅

MW, 312

Constituent of the root of *Rumex obtusifolius*. Yellow leaflets from EtOH. M.p. 206° decomp. Spar. sol. EtOH. Insol. H₂O. Yellow sols in alkalis. Alc. FeCl₃ → brown col.

Hesse, *Ann.*, 1899, **309**, 51.

Lappaconine

C₂₃H₃₇O₆N

MW, 423

Cryst. + 1½ H₂O from H₂O. M.p. 96°. [α]_D²⁵ + 16.3° in EtOH. Sol. EtOH, CHCl₃, C₆H₆. Spar. sol. Et₂O, pet. ether.

B,HCl: m.p. 246-7°.

B,HAuCl₄,H₂O: m.p. 126-7°.

Weidemann, *Chem. Zentr.*, 1923, I, 603.

Schulze, Ulfert, *Arch. Pharm.*, 1922, **260**, 230.

Lappaconitic Acid.

Acetylanthranilic Acid, *q.v.*

Lappaconitine

C₃₂H₄₄O₉N₂

MW, 600

Alkaloid from *Aconitum septentrionale*. Plates from EtOH. M.p. 223° (214°). [α]_D¹⁸ + 27° in CHCl₃. Sol. CHCl₃. Spar. sol. H₂O, EtOH, Et₂O, C₆H₆. Forms no cryst. salts. Acid hyd. → lappaconine + anthranilic acid + CH₃-COOH. Alk. hyd. → lappaconitic acid. Paralyzes the heart and stops respiration.

See references under Lappaconine, above.

Laricin.

See Maltol.

Laricinic Acid.

See Maltol.

Laricinoleic Acid

C₂₀H₃₀O₂

MW, 302

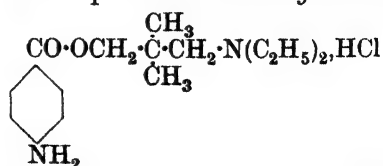
Acid occurring combined in larch turpentine. Leaflets from EtOH. M.p. 135-6°. Sol. EtOH, Et₂O, Me₂CO, AcOH, pet. ether. Gives Liebermann and Salkowski tests.

Tschirch, Weigel, *Arch. Pharm.*, 1900, **238**, 399.

Larixinic Acid.

See Maltol.

Larocaine (2 : 2-Dimethyl-3-diethylamino-propyl alcohol p-aminobenzoate hydrochloride)



C₁₆H₂₇O₂N₂Cl

MW, 314.5

32

Cryst. M.p. 196°. Sol. H₂O. Spar. sol. cold EtOH. Cryst. ppts. with Reinecke's salt, picric acid, trinitroresorcinol, KBr, KI. Local anæsthetic. Twice as active and less toxic than cocaine.

Mannich, Lesser, Silten, *Ber.*, 1932, **65**, 378.

Rosenthaler, *Chem. Abstracts*, 1932, **26**, 4910.

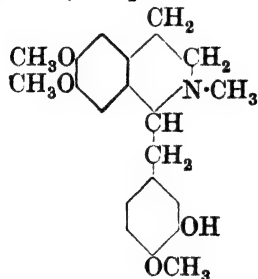
Lasiocarpin

C₂₁H₃₃O₇N MW, 411

Alkaloid from *Heliotropium lasiocarpum*. Leaflets from pet. ether. M.p. 95°. Sol. EtOH, C₆H₆. Spar. sol. H₂O. [α]_D²⁰ - 4°.

Menschikoff, *Ber.*, 1932, **65**, 974.

Laudanidine (Tritopine, l-laudanine)



C₂₀H₂₅O₄N MW, 343

One of the opium alkaloids. Cryst. from EtOH. M.p. 184-5° (177°). [α]_D²⁵ - 100.6° in EtOH. Sol. H₂O, C₆H₆. Spar. sol. EtOH, Et₂O, pet. ether. Sol. conc. H₂SO₄ to yellowish-red sol. Sol. alkalis. FeCl₃ → green col. Strong tetanic poison.

Acetyl: needles from EtOH. M.p. 98°. Sol. EtOH, Me₂CO, CHCl₃. Spar. sol. H₂O, Et₂O. Sol. alkalis. FeCl₃ → green col.

dl - see Laudanine.

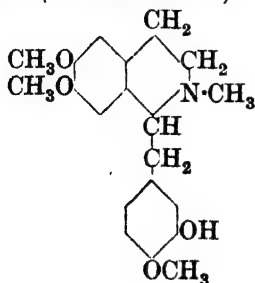
Späth, Bernhauer, *Ber.*, 1925, **58**, 200.

Späth, Burger, *Monatsh.*, 1926, **47**, 733.

Späth, Seka, *Ber.*, 1925, **58**, 1272.

Hesse, *Ann.*, 1894, **282**, 209.

Laudanine (dl-Laudanidine)



C₂₀H₂₅O₄N

MW, 343

One of the opium alkaloids. Prisms from EtOH. M.p. 166°. Sol. CHCl₃, C₆H₆. Spar. sol. H₂O, EtOH, Et₂O. Sol. alkalis. Sol. conc. H₂SO₄ to violet-red sol. FeCl₃ → green col. Strong tetanic poison.

Acetyl: m.p. 40°. Sol. EtOH, Et₂O. Spar. sol. pet. ether.

Oxalate, 6H₂O: m.p. 110°.

Tartrate, 3H₂O: m.p. 100°.

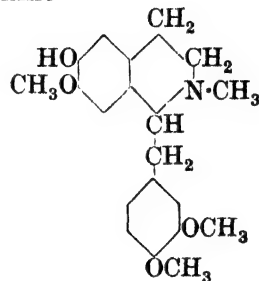
l - see Laudanidine.

Späth, Lang, *Monatsh.*, 1921, **42**, 273.

Späth, *Monatsh.*, 1920, **41**, 297.

See also last reference above.

ψ-Laudanine



C₂₀H₂₅O₄N

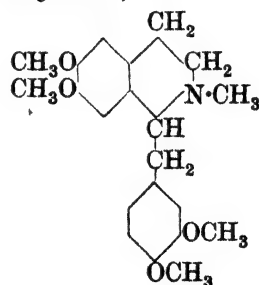
MW, 343

Cryst. from pet. ether, m.p. 112°. Needles + EtOH from 50% EtOH, m.p. 76-80°. Sol. EtOH, C₆H₆.

Picrate: needles from EtOH. M.p. 163°.

Decker, Eichler, *Ann.*, 1913, **395**, 377.

Laudanosine (N-Methyltetrahydropapaverine, laudanaine methyl ether)



C₂₁H₂₇O₄N

MW, 357

d -

One of the opium alkaloids. Needles from C₆H₆. M.p. 89°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Insol. H₂O, alkalis. [α]_D²⁵ + 103.2° in EtOH. Ox. → veratric aldehyde + 4:5-dimethoxy-2:β-methylaminoethylbenzaldehyde. Exhaustive methylation → trimethylamine + tetramethoxy-*o*-vinylstilbene. Strong tetanic poison.

l-.

Cryst. from EtOH. M.p. 89°. $[\alpha]_D^{18} - 105.42^\circ$ in EtOH.

dl-.

Needles from EtOH. M.p. 114–15°. Sol. EtOH, Me₂CO, AcOEt, CHCl₃, C₆H₆. Insol. pet. ether, alkalis.

B, HCl: m.p. 123°.

B₂, H₂PtCl₆: m.p. 160°.

Picrate: m.p. 174°.

Methiodide: m.p. 215–17°.

Pictet, Athanasescu, *Ber.*, 1900, **33**, 2347.

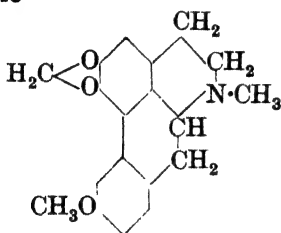
Pictet, Finkelstein, *Ber.*, 1909, **42**, 1979.

Pymman, Reynolds, *J. Chem. Soc.*, 1910, **97**, 1324.

Kondo, Mori, *Journal of the Pharmaceutical Society, Japan*, 1931, **51**, 615.

Lauraldehyde.

See Lauric Aldehyde.

Laureline

C₁₉H₁₉O₃N

MW, 309

l- (Natural).

Alkaloid occurring in New Zealand *Laurelia*. Tablets from EtOH. M.p. 97°. $[\alpha]_D^{18} - 98.5^\circ$ in EtOH. Sol. conc. H₂SO₄ to bluish-red sol. Readily oxidises in air. Acid ox. → mellophanic acid. Alk. ox. → 4-methoxyphthalic anhydride. Exhaustive methylation, followed by oxidation and dist. → methoxy-methylenedioxy-phenanthrene, m.p. 132°. Exerts convulsive action on nerve cells of spinal cord.

B, HCl: m.p. 280°.

B, HNO₃: m.p. 238–40°.

B₂, H₂SO₄: m.p. 105°.

Tartrate: m.p. 220°.

Methiodide: cryst. from EtOH. M.p. 223°.

l- (Synthetic).

Cryst. from pet. ether. M.p. 114°. $[\alpha]_D - 97.7^\circ$ in EtOH.

d-Tartrate: m.p. 211°. $[\alpha]_D + 23.5^\circ$ in EtOH.

d-.

M.p. 114°. $[\alpha]_D + 97.6^\circ$ in EtOH.

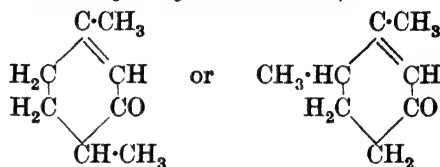
l-Tartrate: m.p. 210°. $[\alpha]_D + 26^\circ$ in EtOH.

Barger, Girardet, *Helv. Chim. Acta*, 1931, **14**, 501.

Barger, Schlittler, *Helv. Chim. Acta*, 1932, **15**, 394.

Aston, *J. Chem. Soc.*, 1910, **97**, 1386.

Laurenone (1 : 4-Dimethyl-1-cyclohexenone-3, or 1 : 6-dimethyl-1-cyclohexenone-3)



C₈H₁₂O

MW, 124

B.p. 92–5°/16 mm. D₄²⁰ 0.9574. n_D 1.48535.

Optically active.

Oxime: prisms. M.p. 105–7°.

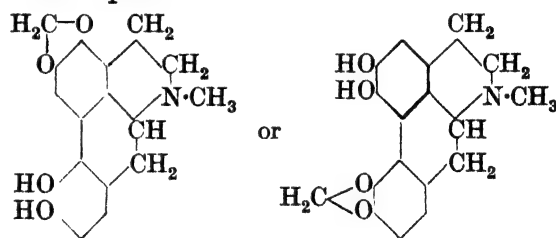
Oxaminoxime: m.p. 159°.

Lapworth, *Report of the British Association for the Advancement of Science*, 1900, 327.

Tiemann, *Ber.*, 1900, **33**, 2950.

Laurent's Acid.

See 1-Naphthylamine-5-sulphonic Acid.

Laurepukin

Suggested structures

C₁₈H₁₇O₄N

MW, 311

Alkaloid from New Zealand *Laurelia*. Needles from Et₃O-CHCl₃. M.p. 230–1°. $[\alpha]_D - 222^\circ$ in CHCl₃.

Di-Me ether: C₂₀H₂₁O₄N. MW, 339. Prisms. M.p. 134°. B.p. 200–210°/10 mm. $[\alpha]_D - 314^\circ$ in CHCl₃. Methiodide: m.p. 249–50°.

Girardet, *Helv. Chim. Acta*, 1931, **14**, 504.

Lauric Acid (Dodecylic acid, undecane-1-carboxylic acid)

CH₃·[CH₂]₁₀·COOH

C₁₂H₂₄O₂

MW, 200

Occurs as glyceride in the fruit of laurels, cocoanut oil, etc. Needles from EtOH. M.p. 44°. B.p. 225°/100 mm., 141–2°/0.6–0.7 mm. D₄²⁰ 0.8690. Sol. pet. ether. Ox. → methyl

nonyl ketone. Na + EtOH (or C_4H_9OH), or catalytic hydrogenation \rightarrow dodecyl alcohol.

Me ester: $C_{13}H_{26}O_2$. MW, 214. M.p. 5° . B.p. $141^\circ/15$ mm.

Et ester: $C_{14}H_{28}O_2$. MW, 228. Solid at -10° . B.p. $163^\circ/25$ mm. D_4^{20} 0.8671. n_D^{20} 1.43269.

Glycerol esters: see Monolaurin, Trilaurin, and under Glycerol.

Dodecyl ester: $C_{25}H_{50}O_2$. MW, 382. M.p. 27° . B.p. $226^\circ/4.5$ mm.

Phenyl ester: $C_{18}H_{28}O_2$. MW, 276. Leaflets from EtOH. M.p. 24.5° . B.p. $210^\circ/15$ mm.

o-Nitrophenyl ester: $C_{18}H_{27}O_4N$. MW, 321. Cryst. from EtOH. M.p. $35-6^\circ$.

p-Tolyl ester: $C_{19}H_{30}O_2$. MW, 290. M.p. 28.5° . B.p. $219.5^\circ/15$ mm.

Phenacyl ester: $C_{20}H_{30}O_3$. MW, 318. Needles. M.p. $48-9^\circ$. Spar. sol. EtOH.

p-Iodophenacyl ester: $C_{20}H_{29}O_3I$. MW, 444. M.p. 85.8° .

Chloride: $C_{12}H_{23}OCl$. MW, 218.5. M.p. -17° . B.p. $145^\circ/18$ mm., $135-40^\circ/10$ mm.

Nitrile: $C_{12}H_{13}N$. MW, 181. M.p. 4° . B.p. $198^\circ/100$ mm. D_4^{15} 0.8273. Sol. EtOH, $CHCl_3$, C_6H_6 . Spar. sol. Et_2O , ligroin.

Amide: $C_{12}H_{25}ON$. MW, 199. Needles. M.p. $110^\circ (102^\circ)$. B.p. $199-200^\circ/12.5$ mm. Sol. EtOH. Insol. H_2O .

Anilide: needles from EtOH.Aq. M.p. $78^\circ (69^\circ)$.

p-Bromoanilide: m.p. 104° .

2:4:6-Tribromoanilide: m.p. 126° .

o-Toluidide: cryst. from Et_2O . M.p. 83° .

p-Toluidide: cryst. from EtOH. M.p. 87° .

o-Phenetidide: m.p. $69.7-70^\circ$.

p-Phenetidide: m.p. $109-10^\circ$.

1-Naphthalide: cryst. from EtOH. M.p. 105° .

2-Naphthalide: m.p. 106° .

Anhydride: $C_{24}H_{46}O_3$. MW, 382. Cryst. M.p. 41.8° . D_4^{20} 0.8533. n_D^{20} 1.4292.

Hydrazide: needles. M.p. 104.5° .

Phenylhydrazide: m.p. $105-6^\circ$.

2-Naphthylhydrazide: m.p. 136° .

Vesely, Haas, *Chem. Abstracts*, 1928, 22, 58.

Holde, Gentner, *Ber.*, 1925, 58, 1418.

Pickard, Kenyon, *J. Chem. Soc.*, 1914, 105, 852.

Dunstan, Thole, Benson, *ibid.*, 791.

Eitner, Wetz, *Ber.*, 1893, 26, 2840.

Krafft, Staufer, *Ber.*, 1882, 15, 2840.

Grün, Schacht, *Ber.*, 1907, 40, 1787.

Grün, v. Skopnik, *Ber.*, 1909, 42, 3755.

Robertson, *J. Chem. Soc.*, 1919, 115, 1210.

Lauric Aldehyde (*Dodecylaldehyde*, *laur-aldehyde*)



$C_{12}H_{24}O$ MW, 184

Occurs in oil from *Chamaecyparis Lawsonia*. Plates. M.p. 44.5° . B.p. $184-5^\circ/100$ mm., $142-3^\circ/22$ mm.

Oxime: m.p. 73° .

2:4-Dinitrophenylhydrazone: m.p. 106° .

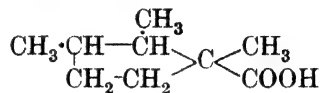
Krafft, *Ber.*, 1880, 13, 1414.

Reinboldt, Dewald, *Ann.*, 1928, 460, 305.

Laurolan.

See 1:2:3-Trimethylcyclopentane.

Laurolic Acid (1:2:3-Trimethylcyclopentane-1-carboxylic acid)



$C_9H_{16}O_2$ MW, 156

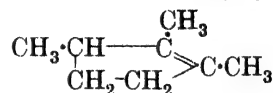
d.

B.p. $215^\circ/749$ mm., $178^\circ/100$ mm. D_D^{25} 0.9008. n_D 1.4579. $[\alpha]_D^{25} + 1.74^\circ$.

Amide: $C_9H_{17}ON$. MW, 155. M.p. $50-1^\circ$.

Noyes, Burke, *J. Am. Chem. Soc.*, 1912, 34, 180.

Laurolene (1:2:3-Trimethylcyclopentene)



C_8H_{14} MW, 110

d.

B.p. 122° . D_4^{15} 0.8097, D_4^{15} 0.8030. n_D 1.44376. $[\alpha]_D^{25} + 28.15^\circ$, $[\alpha]_D^{25} + 22.8^\circ$.

l.

B.p. 119° . D_4^{15} 0.8043. n_D^{25} 1.4432. $[\alpha]_D^{27} - 18.13^\circ$, $[\alpha]_D^{25} - 14.7^\circ$. Oxidises in air.

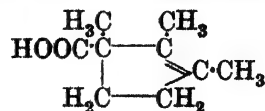
dl.

B.p. $120-1^\circ/752$ mm. (119°). D_D^{15} 0.8039. n_D^{15} 1.4464.

Noyes, Burke, *J. Am. Chem. Soc.*, 1912, 34, 180.

Noyes, Kyriakides, *J. Am. Chem. Soc.*, 1910, 32, 1066.

Laurolenic Acid (1:2:3-Trimethylcyclopentene-3-carboxylic acid, *lauronolic acid*)



$C_9H_{14}O_2$ MW, 154

d.-

Cryst. M.p. 6.5–8° (13°). B.p. 230–5°, 139–40°/17 mm., 104°/0.5–1 mm. D_4^{25} 1.0133. n_D^{20} 1.47155. $[\alpha]_D^{25} + 195.2^\circ$. $k = 1.36 \times 10^{-5}$. Red. \rightarrow lauronic acid.

Amide: $C_9H_{15}ON$. MW, 153. Plates from H_2O . M.p. 71–2°. Sol. H_2O . $[\alpha]_D + 94.61^\circ$.

dl.-

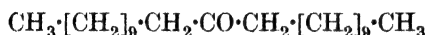
M.p. 5–8.5°. B.p. 192°/100 mm. D_4^{25} 1.0318. n_D 1.4766.

Noyes, Skinner, *J. Am. Chem. Soc.*, 1917, **39**, 2692.

Noyes, Burke, *J. Am. Chem. Soc.*, 1912, **34**, 181.

Tiemann, Tigges, *Ber.*, 1900, **33**, 2946.

Laurone (*Di-n-undecyl ketone*, 12-ketotricosane)



$C_{23}H_{46}O$ MW, 338

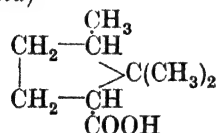
M.p. 69°. Insol. cold EtOH. D_4^{20} 0.7888.

Oxime: m.p. 39–40°.

Kipping, *J. Chem. Soc.*, 1890, **57**, 981.

Krafft, *Ber.*, 1882, **15**, 1712.

Lauronic Acid (*Dihydro- α -campholytic acid*, *camphoceanic acid*, 1:1:2-trimethylcyclopentane-5-carboxylic acid)



$C_9H_{16}O_2$ MW, 156

d.-

Oil. D_4^{20} 0.9915. $[\alpha]_D^{25} + 36.5^\circ$ in pet. ether.

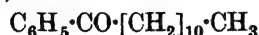
Amide: $C_9H_{17}ON$. MW, 155. Plates from pet. ether. M.p. 86.5°. $[\alpha]_D^{25} + 21.2^\circ$ in pet. ether.

Noyes, Potter, *J. Am. Chem. Soc.*, 1912, **34**, 1079.

Lauronolic Acid.

See Lauronic Acid.

Laurophenone (*Laurylbenzene*, *undecyl phenyl ketone*)



$C_{16}H_{28}O$ MW, 260

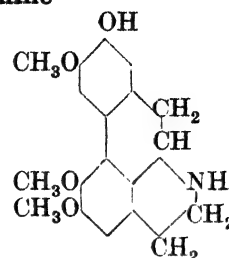
Cryst. M.p. 47° (45°). B.p. 201–2°/9 mm. D_4^{25} 0.87935. n_D^{25} 1.47001.

Kipping, Russell, *J. Chem. Soc.*, 1895, **67**, 508.

Haller, Bauer, *Compt. rend.*, 1909, **149**, 7.

Eijkman, *Chem. Zentr.*, 1904, I, 1259.

Laurotetanine



$C_{19}H_{21}O_4N$

MW, 327

Alkaloid from *Lauraceae*. Cryst. + $1H_2O$ from Me_2CO . M.p. 125°. $[\alpha]_D^{25} + 98.5^\circ$. Turns yellow in air.

Phenylthiocarbamide: m.p. 211–12°.

Picrate: m.p. 148°.

Dibenzoyl deriv.: m.p. 169–70°.

Me ether: $C_{20}H_{23}O_4N$. MW, 341. Amorphous. *B.HCl*: cryst. M.p. 245°. Oxalate: m.p. 233°. Thiocarbamide: m.p. 154–5°.

O : N-Di-Me: see Glaucine.

Greshoff, *Ber.*, 1890, **23**, 3537.

Gorter, *Chem. Abstracts*, 1922, **16**, 2470.

Barger, Eisenbrand, Eisenbrand, Schlittler, *Ber.*, 1933, **66**, 450.

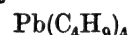
Lauryl Alcohol.

See Dodecyl Alcohol.

Laurylamine.

Dodecylamine, *q.v.*

Lead tetrabutyl

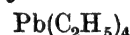


$C_{16}H_{36}Pb$ MW, 435

B.p. 156°/10 mm. in CO_2 .

Danzer, *Monatsh.*, 1926, **46**, 241.

Lead tetra-ethyl



$C_8H_{20}Pb$ MW, 323

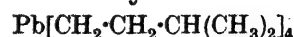
B.p. about 200°, 152°/290.5 mm., 83°/13–14 mm. D_4^{20} 1.6528. n_D^{20} 1.5198. Sol. Et_2O . Insol. H_2O . Volatile in steam. Conc. $HCl \rightarrow$ triethyl lead chloride. $SO_2 \rightarrow$ diethyl sulphone and lead ethyl sulphinate. Used as anti-knock in petrol.

Pfeiffer, Truskier, *Ber.*, 1904, **37**, 1127.

Grüttner, Krause, *Ber.*, 1916, **49**, 1421; *Ann.*, 1918, **415**, 356.

Jones, Werner, *J. Am. Chem. Soc.*, 1918, **40**, 1273.

Lead tetra-isoamyl



$C_{20}H_{44}Pb$ MW, 491

Cryst. in AcOEt at -75° . D_4^{20} 1.2337. $n_D^{20.5}$ 1.4946.

Grüttner, Krause, *Ber.*, 1917, 50, 280.

Lead tetra-isobutyl

$Pb[CH_2 \cdot CH(CH_3)_2]_4$
 $C_{16}H_{36}Pb$ MW, 435

Plates. M.p. -23° . $D_4^{20.2}$ 1.3240. $n_D^{20.2}$ 1.5042.

Grüttner, Krause, *Ber.*, 1917, 50, 282.

Lead tetra-isopropyl

$Pb[CH(CH_3)_2]_4$
 $C_{12}H_{28}Pb$ MW, 379

F.p. -53.5° . B.p. $133-8^{\circ}/27$ mm., $120.0^{\circ}/14$ mm. D_4^{12} 1.4578, D_4^{20} 1.4504. n_D^{12} 1.5260, n_D^{20} 1.5223. Decomp. in air.

Grüttner, Krause, *Ber.*, 1917, 50, 576.

Lead tetramethyl

$Pb(CH_3)_4$
 $C_4H_{12}Pb$ MW, 267

F.p. -27.5° . B.p. $110^{\circ}/760$ mm. Sol. EtOH, Et_2O . Insol. H_2O . D_4^0 2.034, D_4^{20} 1.9952. n_D^{20} 1.5120. Poisonous. Very explosive. Stabilised by small quantities of arylamides.

Grüttner, Krause, *Ber.*, 1916, 49, 1420.

Krause, *Ber.*, 1929, 62, 1877.

Calcott, Parmelee, U.S.P., 1,835,140, (*Chem. Abstracts*, 1932, 26, 977).

Jones, Evans, Gulwell, Griffiths, *J. Chem. Soc.*, 1935, 46.

Lead tetraphenyl

$Pb(C_6H_5)_4$
 $C_{24}H_{20}Pb$ MW, 515

Needles or prisms from C_6H_6 . M.p. 229° ($224-5^{\circ}$). D_4^{20} 1.5298. Sol. diethyl sulphide, dipropylamine. Mod. sol. $CHCl_3$, C_6H_6 , CS_2 . Spar. sol. EtOH, Et_2O , AcOH, ligroin. Decomp. at 270° . $H(+Ni) \rightarrow$ diphenyl.

Werner, Pfeiffer, *Z. anorg. allgem. Chem.*, 1898, 17, 100.

Gilman, Robinson, *J. Am. Chem. Soc.*, 1927, 49, 2315.

Lead tetrapropyl

$Pb(C_3H_7)_4$
 $C_{12}H_{28}Pb$ MW, 379

B.p. $126^{\circ}/13$ mm. D_4^{20} 1.4419. n_D^{20} 1.5094.

Grüttner, Krause, *Ber.*, 1916, 49, 1421.

Lead tetra-*o*-tolyl

$Pb(C_6H_4 \cdot CH_3)_4$
 $C_{28}H_{28}Pb$ MW, 571

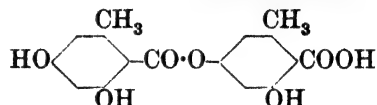
Cryst. from Me_2CO or EtOH. M.p. $201-2^{\circ}$.

Austin, *J. Am. Chem. Soc.*, 1931, 53, 1550.

Lead tetra-*p*-tolyl.

Needles from EtOH. M.p. $239-40^{\circ}$. D_4^{20} 1.4329. Sol. C_6H_6 , $CHCl_3$, CS_2 . $H(+Ni)$ under press. \rightarrow 4 : 4'-dimethyldiphenyl.

Polis, *Ber.*, 1887, 20, 721.

Lecanoric Acid (*p*-Diorcellinic acid)

$C_{16}H_{14}O_7$ MW, 318

Occurs in numerous lichens. Prisms + H_2O from H_2O . M.p. 175° . Sol. Et_2O , Me_2CO , hot EtOH. Spar. sol. cold H_2O , hot C_6H_6 . $FeCl_3 \rightarrow$ purple-red col. Reduces $NH_3 \cdot AgNO_3$. Hot KOH \rightarrow orsellinic acid. Hot alcohols \rightarrow orsellinic esters.

Me ether: see Evernic Acid.

Tri-Me ether: $C_{20}H_{22}O_7$. MW, 374. Needles or prisms from EtOH. M.p. $149.5-150^{\circ}$. Sol. hot EtOH, Me_2CO .

Me ester: $C_{17}H_{16}O_7$. MW, 332. Needles from EtOH. M.p. 146° . Sol. Et_2O , Me_2CO . Spar. sol. C_6H_6 , cold EtOH. *Monoacetyl deriv.*: m.p. 167° . *Diacetyl deriv.*: m.p. $149-50^{\circ}$. *Triacetyl*: m.p. 157° .

Triacetyl: m.p. $197-8^{\circ}$ decomp.

Asahina, Fuzikawa, *Ber.*, 1932, 65, 983.

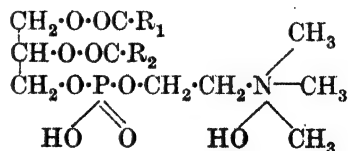
Koller, *Monatsh.*, 1932, 61, 153.

Fischer, Fischer, *Ber.*, 1913, 46, 1143.

Hesse, *J. prakt. Chem.*, 1911, 83, 83, 87, 89, 95; 1898, 57, 264; *Ann.*, 1866, 139, 25.

Lecithin.

Generic name for a group of phosphatides of the following structure



Where $\cdot OC \cdot R_1$ and $\cdot OC \cdot R_2$ are fatty acid radicals, those so far detected including stearic, palmitic, oleic, linolic, linolenic and arachidonic. The lecithins are thus diglycerides in which the

third $-CH_2\cdot OH$ group is linked to the choline ester of phosphoric acid.

The lecithins are white waxy substances, rapidly turning yellow or brown on exposure to air: very hygroscopic, and form colloidal solutions very easily with H_2O : readily hyd. by acids, alkalis and enzymes: form cryst. addn. products with many inorganic salts, particularly $CdCl_2$. The lecithins from egg yolk and soya bean are the best known.

Levene, Rolf, *Physiological Reviews*, 1921, I, 327.

MacLean, MacLean, *Lecithin and Allied Substances* (1927).

Thierfelder, Klenk, *Die Chemie der Cerebroside und Phosphatide* (1930).

Ledol (*Ledum camphor*)

$C_{15}H_{26}O$ MW, 222

Occurs in leaves of *Ledum palustre*. Needles from pet. ether. M.p. 105° . B.p. $282-3^\circ$. Sublimes. Sol. EtOH, Et_2O . Spar. sol. H_2O . $[\alpha]_D^{20} 7.98^\circ$ in EtOH. Dil. $HNO_3 \rightarrow$ oxalic acid.

Hjelt, Collan, *Ber.*, 1882, 15, 2501.

Rizza, *J. Chem. Soc. Abstracts*, 1888, 54, 845.

Komppa, *Chem. Abstracts*, 1934, 28, 4724
Hasenfratz, *Compt. rend.*, 1928, 187, 903.

Leontamine

$C_{14}H_{26}N_2$ MW, 222

Isolated from *Leontica Eversmanii*. B.p. $118-19^\circ/4$ mm. $D_4^{20} 0.9880$. $n_D^{20} 1.5113$. $[\alpha]_D^{25} +2.53^\circ$.

Platinichloride: m.p. 248° decomp.

Di-picrate: m.p. $194-5^\circ$.

Di-methiodide: m.p. $265-8^\circ$.

Orechow, Konowalowa, *Arch. Pharm.*, 1932, 270, 329.

Leontidine.

Isolated from *Leontica Eversmanii*. Needles from pet. ether. M.p. $116-18^\circ$.

$B\cdot HCl$: m.p. 293° decomp.

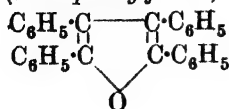
$B_2\cdot H_2PtCl_6$: m.p. $258-9^\circ$ decomp.

See above reference.

Lepargylic Acid.

Azelaic Acid, *q.v.*

Lepidene (*Tetraphenylfuran*)



$C_{28}H_{20}O$ MW, 372

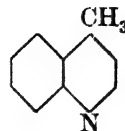
Needles and plates from EtOH-AcOH. M.p. 175° . B.p. 220° . Sol. Et_2O , C_6H_6 , hot EtOH,

AcOH. Insol. H_2O . Ox. $\rightarrow \alpha : \beta$ -dibenzoyl-stilbene.

Zinin, *J. prakt. Chem.*, 1867, 101, 160.

Salkind, Teterin, *J. prakt. Chem.*, 1932, 133, 195.

Lepidine (4-Methylquinoline, γ -methylquinoline)



$C_{10}H_9N$

MW, 143

B.p. $261-3^\circ$ ($133^\circ/15$ mm.). $D_4^{20} 1.0995$, $D_4^{20} 1.0862$. Sol. EtOH, Et_2O , C_6H_6 , ligroin. Spar. sol. H_2O . Ox. \rightarrow cinchoninic acid. $KMnO_4 \rightarrow$ methylpyridine-carboxylic acid and pyridine-2:3:4-tricarboxylic acid.

$B_2\cdot H_2PtCl_6$: m.p. $226-30^\circ$.

$B\cdot H\cdot AuCl_4$: decomp. at $188-90^\circ$.

$B_2\cdot H_2SO_4$: needles. M.p. $228-9^\circ$.

Picrate: m.p. $210-11^\circ$.

Methiodide: prisms. M.p. $173-4^\circ$.

Ethiodide: prisms. M.p. $141-3^\circ$.

Me perchlorate: m.p. 153° .

König, Treichel, *J. prakt. Chem.*, 1921, 102, 80.

Koenigs, Mengel, *Ber.*, 1904, 37, 1328.

Knorr, *Ann.*, 1886, 236, 94.

Weidel, *Monatsh.*, 1882, 3, 75.

Chichibabin, D.R.P., 468,303, (*Chem. Abstracts*, 1929, 23, 607).

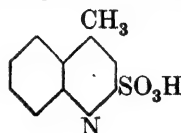
Beyer, *J. prakt. Chem.*, 1886, 33, 418.

Feo, *Bull. soc. chim.*, 1935, 2, 94.

Lepidine-carboxylic Acid.

See 4-Methylquinoline-2-carboxylic Acid and 4-Methylquinoline-6-carboxylic Acid.

Lepidine-2-sulphonic Acid



$C_{10}H_9O_3NS$

MW, 223

Needles from conc. HCl. M.p. above 270° . Spar. sol. H_2O . Boiling $H_2O \rightarrow$ 2-hydroxy-lepidine. Salts hyd. by boiling H_2O .

Besthorn, Geisselbrecht, *Ber.*, 1920, 53, 1024.

Lepidone.

See 2-Hydroxy-4-methylquinoline.

Lepralin.

See Leprarin.

Lepranidin.

See Leprarin.

Lepraninin.

See Leprarin.

Lepranthin $C_{25}H_{40}O_{10}$ MW, 500

Constituent of *Leprantha impolita*. Plates from C_6H_6 -ligroin. M.p. 183° . $[\alpha]_D^{17} + 71^\circ$. Easily sol. EtOH, Et_2O , C_6H_6 . Spar. sol. pet. ether.

Zopf, *Ann.*, 1904, **336**, 48.**Leprarin** $C_{19}H_{18}O_9$ MW, 390

Isolated from *Lepraria latebrarum*, Ach. Plates from EtOH, m.p. 155° : plates + $CHCl_3$ from $CHCl_3$ -ligroin, m.p. 156° . Sol. AcOH, hot EtOH. Spar. sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Sol. acids and alkalis. Insol. H_2O . $[\alpha]_D^{17} + 13.4^\circ$ in $CHCl_3$. $FeCl_3$ in EtOH \rightarrow brownish-red col. $CH_3OH + HCl \rightarrow$ lepraninin, m.p. 135° . $C_2H_5OH + HCl \rightarrow$ lepranidin, m.p. $121-2^\circ$. $C_3H_7OH + HCl \rightarrow$ lepralin, m.p. 100° .

Zopf, *Ann.*, 1897, **295**, 290; 1900, **313**, 318.Kassner, *Arch. Pharm.*, 1901, **239**, 44.**Leptospermol** $C_{14}H_{20}O_4$ MW, 252

Oil from "*Leptospermum*." B.p. $275-8^\circ$, $145-6^\circ/10$ mm. $D_4^{20} 1.073$. $n_D^{20} 1.500$. $FeCl_3 \rightarrow$ orange-red col. Cu salts \rightarrow blue col.

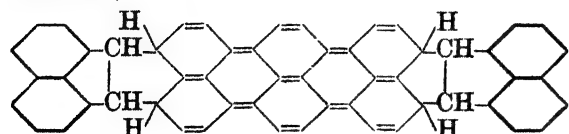
Penfold, *Chem. Abstracts*, 1922, **16**, 139.**Lettocine** $C_{17}H_{25}O_2N$ MW, 275

Alkaloid of *Holarrhena Antidysenterica*. Light brown cryst. powder from $CHCl_3$ -pet. ether. M.p. $350-2^\circ$. Sol. EtOH, $CHCl_3$. Spar. sol. Et_2O , pet. ether.

B.HI: yellowish-brown cryst. powder from EtOH.Aq. M.p. 256° decomp.

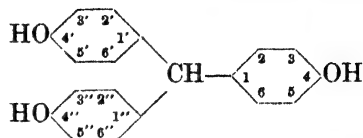
Picrate: cryst. from hot EtOH. M.p. 198° .

Methiodide: cryst. from MeOH. M.p. 235° .

Peacock, Chowdhury, *J. Chem. Soc.*, 1935, 734.**Leucacene** (peri-Diacenaphthylenerhodacene, leukacene) $C_{54}H_{32}$

MW, 680

Colourless plates or needles. M.p. 250° . Turns pink in air. Heat to $175^\circ \rightarrow$ acenaphthylene + rhodacene. $CrO_3 \rightarrow$ naphthoic acid.

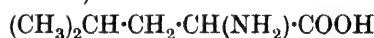
Dziewoński, *Ber.*, 1920, **53**, 2173.**Leucaurine** (4:4':4''-Trihydroxytriphenylmethane) $C_{19}H_{16}O_3$ MW, 292

Prisms from AcOH. Very sol. EtOH, AcOH. Spar. sol. H_2O . Alk. sol. oxidises rapidly in air. *Triacetyl*: needles. M.p. $138-9^\circ$. Sol. hot EtOH, Et_2O .

Tri-Me ether: $C_{22}H_{22}O_3$. MW, 334. Needles from EtOH. M.p. $45-7^\circ$. Spar. sol. EtOH, Et_2O , ligroin.

Baeyer, Villiger, *Ber.*, 1902, **35**, 1197.Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 771.

Dale, Schorlemmer, *Ann.*, 1873, **166**, 286. Hevzig, Smoluchowski, *Monatsh.*, 1894, **15**, 80.

Leucine (1-Aminoisocaproic acid, 1-aminoisobutylic acid) $C_6H_{13}O_2N$ MW, 131*d.*

Plates from EtOH. M.p. 293° (sealed tube). Sol. 48 parts H_2O at 20° . $[\alpha]_D^{20} + 10.34^\circ$ in H_2O , $[\alpha]_D^{20} - 15.6^\circ$ in 20% HCl.

N-Formyl: cryst. M.p. $141-4^\circ$. $[\alpha]_D^{20} + 19.2^\circ$ in EtOH.

N-Benzoyl: cryst. + $\frac{1}{2}H_2O$ from Et_2O -ligroin. M.p. 60° , anhyd. $105-7^\circ$. $[\alpha]_D^{20} - 6.39^\circ$ in KOH. Sol. 120 parts boiling H_2O .

Fischer, Warburg, *Ber.*, 1905, **38**, 3997.Fischer, *Ber.*, 1900, **33**, 2370.Ehrlich, *Biochem. Z.*, 1906, **1**, 25.Schultze, Likiernik, *Z. physiol. Chem.*, 1893, **17**, 518.*l.*

Obtained by hyd. of most proteins. Plates from EtOH.Aq. M.p. $293-5^\circ$ decomp. $[\alpha]_D^{20} - 10.42^\circ$ in H_2O , $[\alpha]_D^{15} + 17.3^\circ$ in 20% HCl. Sol. 46 parts H_2O at 18° .

Me ester: $C_7H_{15}O_2N$. MW, 145. B.p. $79-79.5^\circ/12$ mm. $[\alpha]_D^{15} + 16.52^\circ$. $D^{17} 0.9533$. *Hydrochloride*: α -form, m.p. 118° ; β -form, m.p. 148° .

Et ester: $C_8H_{17}O_2N$. MW, 159. B.p. $196^\circ/761$ mm., $88^\circ/18$ mm., $83.5^\circ/12$ mm. $[\alpha]_D^{20} + 13.1^\circ$. *Hydrochloride*: prisms from AcOEt-ligroin. M.p. 134° . $[\alpha]_D + 18.4^\circ$.

N-Formyl: needles. $[\alpha]_D^{20} - 18.4^\circ$ in EtOH.

N-Acetyl: m.p. 181° . $[\alpha]_D^{20} - 16.99^\circ$.

N-Benzoyl: cryst. M.p. 60° (hydrated), $105-7^\circ$ (anhyd.).

Fischer, *Ber.*, 1900, **33**, 2377; 1901, **34**, 445.

Abderhalden, Spinner, *Z. physiol. Chem.*, 1919, **107**, 1.

Ehrlich, Wendel, *Biochem. Z.*, 1908, **8**, 399.

Fischer, Warburg, *Ber.*, 1905, **38**, 4002.

Cherbuliez, Plattner, Ariel, *Helv. Chim. Acta*, 1930, **13**, 1390.

dl.

Plates from H_2O . M.p. $293-5^\circ$ (sealed tube). Sol. 106 parts H_2O at 15° . Very spar. sol. EtOH.

Et ester: b.p. $196^\circ/761$ mm., $88^\circ/18$ mm., $83.5^\circ/12$ mm. Misc. with EtOH, Et_2O , C_6H_6 , ligroin. *N-Acetyl*: b.p. $114^\circ/2$ mm., $101-3^\circ/1$ mm. *N-Benzoyl*: m.p. 79° .

p-Nitrobenzyl ester: m.p. $184-5^\circ$.

Amide: $C_8H_{14}ON_2$. MW, 130. Prisms from C_6H_6 . M.p. $106-7^\circ$. Very sol. EtOH, Me_2CO . Sol. H_2O . Spar. sol. C_6H_6 . *N-Benzoyl*: plates from ligroin. M.p. 171° .

N-Benzoyl: needles or plates. M.p. $137-41^\circ$. Sol. EtOH, Et_2O , $CHCl_3$, AcOH. Spar. sol. C_6H_6 . Insol. ligroin. *Me ester*: cryst. from ligroin. M.p. $95-6^\circ$.

Abderhalden, Wybert, *Ber.*, 1916, **49**, 2455.

Bergell, Wülfing, *Z. physiol. Chem.*, 1910, **64**, 361.

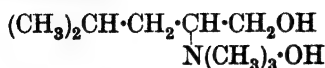
Fischer, *Ber.*, 1900, **33**, 2373; 1901, **34**, 444; 1905, **38**, 615.

Koenigs, Mylo, *Ber.*, 1908, **41**, 4438.

Max, *Ann.*, 1909, **369**, 280.

Bouveault, Locquin, *Bull. soc. chim.*, 1906, **35**, 968 (Footnote).

Leucine-choline



$C_9H_{25}O_2N$ MW, 177

Hygroscopic solid.

Iodide: needles from EtOH. M.p. $141-2^\circ$. Very sol. H_2O . Sol. EtOH.

Chloride: needles from EtOH- Et_2O . M.p. 173° .

Picrate: cryst. from H_2O . M.p. 136° .

Aurichloride double salt: m.p. $98-100^\circ$.

Platinichloride double salt: m.p. $211-13^\circ$.

Karrer et al., *Helv. Chim. Acta*, 1922, **5**, 469.

Leucinic Acid.

See 1-Hydroxyisocaproic Acid.

Leucinol.

2-Amino-4-methyl-*n*-amyl Alcohol, *q.v.*

Leuco-indigo.

See Indigo White.

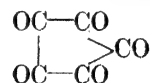
Leucoisonaphthazarin.

See 1 : 2 : 3 : 4-Tetrahydroxynaphthalene.

Leuconaphthazarin.

See 1 : 4 : 5 : 8-Tetrahydroxynaphthalene.

Leuconic Acid (*Pentaketopentamethylene*, *pentaketocyclopentane*, *cyclopentane-pentone*)



C_5O_5

MW, 140

Cryst. from HNO_3 (sp. gr. 1.36). Sol. H_2O . Spar. sol. EtOH. Prac. insol. Et_2O . Sweet taste.

Tetra-oximine: cryst. from H_2O . Explodes about 160° .

Penta-oxime: yellow cryst. Decomp. at 172° . Insol. most org. solvents. Sol. NaOH. *Tetra-acetyl*: needles from C_6H_6 . Decomp. about 50° . Spar. sol. $CHCl_3$, C_6H_6 .

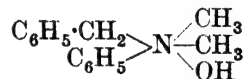
Nietzki, Benckiser, *Ber.*, 1886, **19**, 293.

Nietzki, Rosemann, *Ber.*, 1889, **22**, 918.

Homolka, *Ber.*, 1922, **55**, 1310.

Contardi, *Gazz. Chim. ital.*, 1921, **51**, 109.

Leucotrope (*Dimethylphenylbenzylammonium hydroxide*)



$C_{15}H_{19}ON$

MW, 229

Strongly alkaline syrup. Dist. \rightarrow dimethyl-aniline + benzyl alcohol. NaHg \rightarrow dimethyl-aniline + toluene. Used as benzylating agent. Leucotrope and its sulphonic derivatives are employed in calico printing.

Chloride: dimethylphenylbenzylammonium chloride. $C_{15}H_{18}NCl$. MW, 247.5. Plates from H_2O or EtOH. M.p. 110° , $113-16^\circ$ (116°) anhyd. Very sol. H_2O , EtOH. Insol. Et_2O .

Bromide: dimethylphenylbenzylammonium bromide. $C_{15}H_{18}NBr$. MW, 292. Plates from H_2O or $CHCl_3-Me_2CO$. Decomp. at $107-8^\circ$.

Iodide: dimethylphenylbenzylammonium iodide. $C_{15}H_{18}NI$. MW, 339. Prisms from

H₂O or 50% EtOH. M.p. 164°. Sublimes undecomp. in vacuo. Sol. CHCl₃, Me₂CO₃, hot EtOH.

Chlorate: cryst. hygroscopic mass. M.p. 137° decomp.

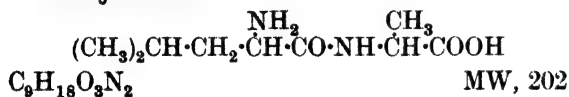
Michler, Gradmann, *Ber.*, 1877, **10**, 2078.

Wedekind, Paschke, *Ber.*, 1910, **43**, 1306.

Wedekind, *Ber.*, 1906, **39**, 484.

Emde, *Arch. Pharm.*, 1911, **249**, 108.

Leucylalanine



l-Leucyl-*d*-alanine.

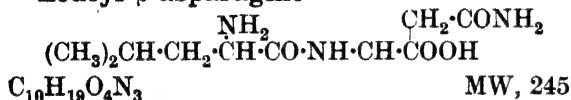
Plates from EtOH. M.p. about 257°. Very sol. H₂O. Sol. MeOH. Spar. sol. EtOH. $[\alpha]_D^{20} + 22.9^\circ (+19.84^\circ)$.

Inactive leucylalanine.

Plates from H₂O. M.p. 248° → anhydride. Sol. 60 parts H₂O at ord. temp. Insol. EtOH, Et₂O, C₆H₆.

Fischer, Warburg, *Ann.*, 1905, **340**, 160.

Leucyl-β-asparagine



d-Leucyl-*l*-asparagine.

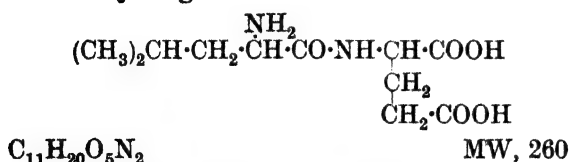
Cryst. from H₂O. M.p. 230° decomp. Very spar. sol. EtOH. $[\alpha]_D^{20} - 53.8$ in H₂O.

l-Leucyl-*l*-asparagine.

Cryst. from H₂O: needles from EtOH.Aq. M.p. 228°. $[\alpha]_D^{20} + 17.8^\circ$ in H₂O.

Fischer, Koenigs, *Ber.*, 1904, **37**, 4591; 1907, **40**, 2051.

l-Leucyl-*d*-glutamic Acid



Needles from H₂O. M.p. 232° decomp. Sol. H₂O, dil. HCl. Spar. sol. EtOH. $[\alpha]_D^{20} + 10.5^\circ$ in N/HCl. Hyd. by pancreatic juices.

Anhydride: C₁₁H₁₈O₄N₂. MW, 242. Needles from MeOH. M.p. 200° decomp.

Amide: *l*-leucyl-*d*-glutamine. C₁₁H₂₁O₄N₃. MW, 259. Needles from EtOH.Aq. M.p. 235–6°. $[\alpha]_D^{18} + 12.6^\circ$ in dil. HCl. Sol. H₂O, dil. acids, dil. alkalis. Insol. EtOH. Hyd. by HCl.

Fischer, *Ber.*, 1907, **40**, 3559, 3711.

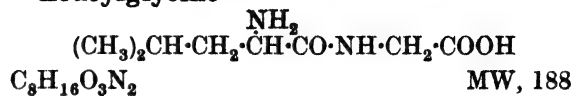
Thierfelder, v. Cramm., *Z. physiol. Chem.*, 1919, **105**, 79.

Abderhalden, *Z. physiol. Chem.*, 1926, **154**, 18.

Leucylglutamine.

See under Leucylglutamic Acid.

Leucylglycine



l.

Needles from EtOH.Aq. M.p. 248° after darkening at 235°. $[\alpha]_D^{20} + 81.5^\circ$ in H₂O.

dl.

Cryst. from H₂O. M.p. 243° (rapid heat.). Sol. 15 parts H₂O. Insol. most org. solvents.

Me ester: C₉H₁₈O₃N₂. MW, 202. *Hydrochloride*: m.p. 133°.

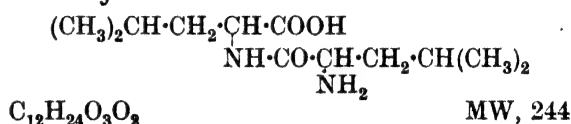
Fischer, *Ber.*, 1906, **39**, 2911.

Fischer, Brunner, *Ann.*, 1905, **340**, 144.

Schönheimer, *Z. physiol. Chem.*, 1926, **154**, 203.

Abderhalden, Kröner, *Z. physiol. Chem.*, 1928, **178**, 282.

Leucyl-leucine



l-Leucyl-*l*-leucine.

Plates from H₂O or hot EtOH. M.p. 270°. $[\alpha]_D^{20} - 13.36^\circ$ in NaOH.

Inactive leucyl-leucine A.

Needles + 1½ H₂O from H₂O. M.p. 270° after sintering at 260°. Sol. 30 parts boiling H₂O. Sol. MeOH. Spar. sol. EtOH. Insol. Et₂O.

Inactive leucyl-leucine B.

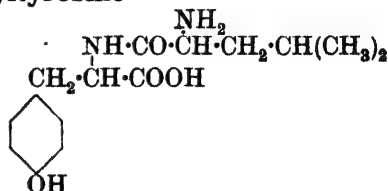
Plates from EtOH. M.p. 267–8° decomp. Sol. 50 parts boiling H₂O.

Fischer, Koelker, *Ann.*, 1907, **354**, 40.

Fischer, *Ber.*, 1906, **39**, 2918.

Fischer, Abderhalden, *Z. physiol. Chem.*, 1907, **51**, 267.

Leucyltyrosine



C₁₅H₂₂O₄N₂

MW, 294

l-Leucyl-l-tyrosine.

Cryst. + 2H₂O. M.p. 275–7°. [α]_D²⁰ + 11.3°. Sol. H₂O. Spar. sol. EtOH.

d-Leucyl-l-tyrosine.

Powder + 2H₂O from Et₂O–EtOH. M.p. 250–60° decomp. [α]_D²⁰ – 16°.

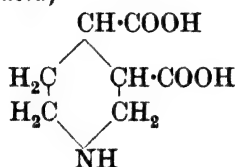
Abderhalden, Bahn, *Chem. Zentr.*, 1930, II, 2271.

For Leucyl o- and m-tyrosines see Abderhalden, Schairer, *Chem. Zentr.*, 1931, I, 2210.

Leucacene.

See Leucacene.

Leuponic Acid (Loiponic acid, hexahydrocinchomeronic acid)



C₇H₁₁O₄N

MW, 173

Unstable form of hexahydrocinchomeronic acid (*q.v.*), into which it is converted by KOH. Prisms from H₂O. M.p. 254–60° decomp. Sol. 20 parts boiling H₂O. Very spar. sol. EtOH. Slightly dextrorotatory in HCl.

B.HCl: prisms. M.p. 216–20°. Spar. sol. H₂O.

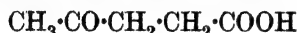
B.HAuCl₄: plates. M.p. 201–2°.

Acetyl: cryst. M.p. 204°. Anhydride: cryst. M.p. 161–3°.

Skraup, *Monat.*, 1896, 17, 380.

Koenigs, *Ber.*, 1897, 30, 1326.

Levulinic Acid (Lævulinic acid, levulic acid, 2-acetopropionic acid, 3-keto-n-valeric acid)



C₅H₈O₃

MW, 116

Cryst. M.p. 33–5°. B.p. 245–6°, 143–7°/14 mm., 137–9°/10 mm. Very sol. H₂O, EtOH, Et₂O. D₄¹⁵ 1.1447, D₄²⁵ 1.1351, D₄³⁰ 1.1140, D₄⁷⁵ 1.0924. n_D^{15} 1.442. $k = 2.4 \times 10^{-5}$ at 25°.

Oxime: plates from H₂O. M.p. 95–6°. Very sol. H₂O, EtOH, Et₂O. $k = 2.303 \times 10^{-5}$ at 25°. Acetyl: cryst. M.p. 75°.

Phenylsemicarbazone: needles from EtOH. M.p. 185–6°.

p-Tolylsemicarbazone: needles from H₂O or CHCl₃. M.p. 179–80°.

p-Nitrophenylhydrazine: needles from EtOH. M.p. 174–5°.

2:4-Dinitrophenylhydrazine: yellow cryst. from CHCl₃. M.p. 206.5°.

2-Naphthylhydrazine: yellowish-orange plates from C₆H₆. M.p. 143–4°. Picrate: yellowish-orange needles. M.p. 176° decomp.

3-Nitrobenzoylhydrazine: orange-yellow cryst. from H₂O. M.p. 185–6°.

o-Chlorobenzoylhydrazine: needles from EtOH. M.p. 215°.

p-Chlorobenzoylhydrazine: plates from H₂O. M.p. 135–7°.

Me ester: C₆H₁₀O₃. MW, 130. B.p. 196°. D₄²⁰ 1.04745. n_D^{20} 1.42333. Semicarbazone: cryst. M.p. 142–3°. Phenylhydrazine: cryst. from EtOH. M.p. 105–6°. 2:4-Dinitrophenylhydrazine: cryst. from EtOH. M.p. 141–2°.

Et ester: C₇H₁₂O₃. MW, 144. B.p. 205.8°. D₄²⁰ 1.01114. n_D^{20} 1.42288. Semicarbazone: m.p. 147–8°. Phenylhydrazine: cryst. M.p. 103–4°. 2:4-Dinitrophenylhydrazine: cryst. from EtOH. M.p. 101°. 2-Naphthylhydrazine: yellowish-orange prisms from EtOH.Aq. M.p. 138–9°. 3-Nitrobenzoylhydrazine: needles from EtOH.Aq. M.p. 136°. p-Chlorobenzoylhydrazine: plates from EtOH.Aq. M.p. 106–8°.

Propyl ester: C₈H₁₂O₃. MW, 158. B.p. 221–2°. D₄²⁰ 0.98955. n_D^{20} 1.42576. Semicarbazone: cryst. M.p. 129–30°. Phenylhydrazine: cryst. M.p. 88–90°. 2:4-Dinitrophenylhydrazine: cryst. M.p. 63°.

Isopropyl ester: b.p. 209.3°. D₄²⁰ 0.98724. n_D^{20} 1.42088. Semicarbazone: cryst. M.p. 141–2°. Phenylhydrazine: cryst. M.p. 108–9°. 2:4-Dinitrophenylhydrazine: cryst. M.p. 90–9°.

Butyl ester: C₉H₁₆O₃. MW, 172. B.p. 237.8°. D₄²⁰ 0.97353. n_D^{20} 1.42095. Semicarbazone: cryst. M.p. 102–3°. Phenylhydrazine: cryst. M.p. 78–81°. 2:4-Dinitrophenylhydrazine: cryst. M.p. 65.8°.

sec.-n-Butyl ester: b.p. 225.8°. D₄²⁰ 0.9669. n_D^{20} 1.42499.

Isobutyl ester: b.p. 230.9°. D₄²⁰ 0.9677. n_D^{20} 1.4267. Semicarbazone: m.p. 112–13°. Phenylhydrazine: m.p. 84.6°. 2:4-Dinitrophenylhydrazine: m.p. 55.6°.

n-Amyl ester: C₁₀H₁₈O₃. MW, 186. B.p. 253.4°. D₄²⁰ 0.96136. n_D^{20} 1.43192. 2:4-Dinitrophenylhydrazine: m.p. 84.2°.

Isoamyl ester: b.p. 248.8°. D₄²⁰ 0.96029. n_D^{20} 1.43102. Semicarbazone: m.p. 91–2°. Phenylhydrazine: m.p. 70–2°. 2:4-Dinitrophenylhydrazine: m.p. 50.5°.

n-Hexyl ester: C₁₁H₂₀O₃. MW, 200. B.p. 266.8°. D₄²⁰ 0.95332. n_D^{20} 1.4343. 2:4-Dinitrophenylhydrazine: m.p. 56.6°.

n-Heptyl ester: C₁₂H₂₂O₃. MW, 214. B.p. 283.5°. n_D^{20} 1.4360. D₄²⁰ 0.94332. 2:4-Dinitrophenylhydrazine: m.p. 79.0°.

Allyl ester: $C_8H_{12}O_3$. MW, 142. B.p. 219–22° decomp., 133–6°/40 mm. D_4^{20} 1.0277. n_D^{20} 1.4413. *Semicarbazone*: cryst. from EtOH. M.p. 126–7°. *Phenylhydrazone*: cryst. from C_6H_6 . M.p. 79–80°.

p-Nitrobenzyl ester: cryst. M.p. 60.5–61°. Sol. 162 parts cold EtOH, 32 parts boiling EtOH.

p-Bromophenacyl ester: cryst. M.p. 84.0°.

Anilide: m.p. 101–2°. *Anil*: cryst. from Me_2CO . M.p. 145°.

1-Naphthalide: cryst. from anisole. M.p. 105–6°.

2-Naphthalide: cryst. from C_6H_6 . M.p. 107–8°.

Sah et al., *Chem. Abstracts*, 1935, **29**, 465.

Cowley, Schuette, *J. Am. Chem. Soc.*, 1933, **55**, 3463 (*Bibl.*).

Lukeš, Prelog, *Chem. Abstracts*, 1930, **24**, 4762.

McKenzie, *Organic Syntheses*, Collective Vol. I, 328.

Levulinic Alcohol.

See 3-Acetopropyl Alcohol.

Levulinic Aldehyde (2-Acetopropionaldehyde, 3-ketovaleraldehyde, 1-pentanalone-4, 2-pentanon-5)



$C_5H_8O_2$ MW, 100

Oil. B.p. 186–8° slight decomp., 70°/12 mm., 66°/8.5 mm. n_D^{21} 1.42567. Misc. in all proportions with H_2O , EtOH, Et_2O . Volatile in steam. Reduces Fehling's and $NH_3 \cdot AgNO_3$.

Dioxime: prisms from Et_2O . M.p. 73–4°.

Di-semicarbazone: cryst. from MeOH. M.p. 180–2°.

Di-p-nitrophenylhydrazone: m.p. 284–5°.

Di-Me acetal: $C_7H_{14}O_3$. MW, 146. Oil. B.p. 87–8°/17 mm., 79–80°/13 mm. D_{18}^{18} 0.9684. Misc. with EtOH, Et_2O in all proportions. Sol. 6 parts H_2O . Reduces Fehling's on boiling.

Di-Et acetal: $C_9H_{18}O_3$. MW, 174. Oil. B.p. 92–3°/11–12 mm.

Harries, Turk, *Ann.*, 1910, **374**, 345.

Fischer, Düll, Ertel, *Ber.*, 1932, **65**, 1470.

Levulose.

See Fructose.

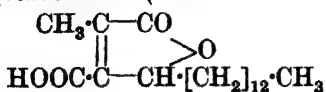
Lewisite.

See 2-Chlorovinylchloroarsine.

Licareol.

See Linalool.

Lichesteric Acid (Lichesterinic Acid)



$C_{19}H_{32}O_4$

MW, 324

l.

Isolated from Iceland Moss and other lichens. M.p. 124.5–125° (121–2°). $[\alpha]_D^{25}$ –32.66°. Sol. AcOH, $CHCl_3$, CS_2 , C_6H_6 . Mod. sol. pet. ether. Insol. H_2O . $KOH \cdot Aq.$ → lichesterylic acid + CO_2 . $KMnO_4$ → myristic acid.

NH₄ salt: m.p. 106°.

Me ester: $C_{20}H_{34}O_4$. MW, 338. Prisms. M.p. 53.4°. $[\alpha]_D^{14}$ –28.07° in $CHCl_3$.

Asano, Kanematsu, *Ber.*, 1932, **65**, 1175.

Böhme, *Arch. Pharm.*, 1903, **241**, 1.

Sinnbold, *Arch. Pharm.*, 1898, **236**, 504.

Lichesterinic Acid.

See Lichesteric Acid.

Lichesterylic Acid (2-Myristylisobutyric acid, 3-keto-1-methylheptadecylic acid)



$C_{18}H_{34}O_3$ MW, 298

M.p. 83–4°. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Insol. H_2O .

Semicarbazone: m.p. 126°.

Asano, Kanematsu, *Journal of the Pharmaceutical Society, Japan*, 1931, **51**, 390.

Asano, Ohta, *ibid.*, 395.

Sinnbold, *Arch. Pharm.*, 1898, **236**, 515.

Lignocerane

$C_{24}H_{50}$ MW, 338

Plates from Et_2O . M.p. 51–51.5°. B.p. 222–5°/9 mm. Probably identical with *n*-tetracosane.

Levene, West, *J. Biol. Chem.*, 1913, **14**, 265; 1914, **18**, 480.

Lignoceryl Alcohol

$C_{24}H_{50}O$ MW, 354

Cryst. from EtOH or Me_2CO . M.p. 76°. CrO_3 → lignoceric acid. Probably identical with *n*-tetracosanol.

Acetyl: m.p. 56°.

Sandqvist, Gorton, Bengtsson, *Ber.*, 1931, **64**, 2172.

Lignoceric Acid

$C_{24}H_{48}O_2$ MW, 368

M.p. 83.5° (80–1°). Sol. EtOH. As obtained from beechwood tar is practically pure *n*-tetracosanic acid. As obtained from pea-nut oil is a mixture of near homologues.

Me ester: $C_{25}H_{50}O_2$. MW, 382. Plates. M.p. 56.5–57° (57–8°, 58–59.8°).

Et ester: $C_{26}H_{52}O_2$. MW, 396. M.p. 56°. B.p. 305–10°/15–20 mm.

Chloride: $C_{24}H_{47}OCl$. MW, 386.5. Yellow plates from Et_2O . M.p. 48–50°.

Phenacyl ester: m.p. 87–8°.

p-Chlorophenacyl ester: m.p. 99–100°.

p-Bromophenacyl ester: m.p. 90–1°.

Cholesteryl ester: m.p. 87°. $[\alpha]_D^{20} - 18.7^\circ$.

2-Methyl-5-isopropylanilide: m.p. 84–5°.

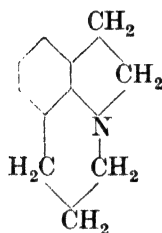
Francis, Piper, Malkin, *Proc. Roy. Soc.*, 1930, 128A, 242.

Hell, Hermanns, *Ber.*, 1880, 13, 1713.

Kreiling, *Ber.*, 1888, 21, 880.

Holde, Godbole, *Ber.*, 1926, 59, 36.

Lilolidine



$C_{11}H_{13}N$

MW, 159

B.p. 156°/15 mm. Turns red on standing.

Picrate: cryst. from EtOH. M.p. 138°.

v. Braun, Heider, Wyczatkowska, *Ber.*, 1918, 51, 1219.

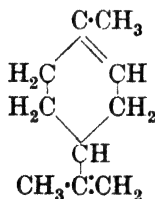
Limene.

Bisabolene, *q.v.*

Limettin.

See Citropten, Addendum, Vol. I.

Limonene (1-Methyl-4-isopropenyl- Δ^1 -cyclohexene, Δ^1 , 8(9)-p-menthadiene)



$C_{10}H_{16}$

MW, 136

dl. Dipentene, cinene.

Found in *Oleum cinæ* and pine needle oil. Formed during the distillation of rubber by polymerisation of isoprene. B.p. 178°/760 mm. (177.6°/760 mm.). $D_4^{20-24} 0.8402$. $n_D^{19-20} 1.4727$. Min. acids \rightarrow terpinene and *p*-cymene. Dil. $H_2SO_4 + AcOH \rightarrow$ acetyl- α -terpineol. H (+ Ni or Pt) at 180° \rightarrow *p*-menthane. H (+ Cu or Pt) at 180° \rightarrow Δ^1 -*p*-menthene. S \rightarrow *p*-cymene. Hot metal filaments \rightarrow isoprene. Ox. (moist air) \rightarrow *dl*-

carveol + *dl*-carvone. $KMnO_4 \rightarrow 1:2:8:9$ -tetrahydroxy-*p*-menthane + lactone of hydroxy-terpenylic acid + terebic acid. HCl (dry) \rightarrow limonene hydrochloride. HCl (moist) \rightarrow limonene dihydrochloride. HBr \rightarrow limonene dihydrobromide. Br \rightarrow limonene tetrabromide. NOCl \rightarrow limonene α - and β -nitrosochlorides. $N_2O_4 \rightarrow$ limonene nitrosate. Perbenzoic acid or peracetic acid \rightarrow limonene monoxide + dioxide.

Hydrochloride: b.p. 110°/26 mm. $D_4^0 0.9927$.

Dihydrochloride: *trans*-form. M.p. 50–1°. B.p. 110–12°/10 mm. *Cis*-form. M.p. about 25°.

Dihydrobromide: *trans*-form. M.p. 64°. *Cis*-form. M.p. 38°.

Dihydriodide: *trans*-form. M.p. 81° (78–9°).

Tetrabromide: m.p. 125–6°.

Nitrosochloride: m.p. 78°. Solidifies on further heating and melts again at 104°.

Nitrosate: m.p. 84°.

Nitrolaniline: α -form, m.p. 126°. β -Form, m.p. 149°.

Nitrolpiperidine: α -form, m.p. 154°. β -Form, m.p. 152°.

d. Carvene, citrene, hesperidene.

Chief constituent of oil of orange rind, dill oil, and oil of cumin, neroli, bergamot, caraway, and lemon. B.p. 178°/760 mm. (176–176.4°). $D_4^0 0.8584$, $D_4^1 0.8576$, $D_4^{20} 0.8411$, $D_{25}^{20} 0.8437$. $n_D^{21} 1.47428$. $[\alpha]_D^{20} + 126.84^\circ$.

Hydrochloride: b.p. 97–8°/11–12 mm. $D^{17-8} 0.973$. $[\alpha]_D + 39.5^\circ$.

Tetrabromide: cryst. from AcOEt. M.p. 104–5°. $[\alpha]_D + 73.4^\circ$ in $CHCl_3$.

Diozonide: m.p. 60–5°. $[\alpha]_D^{18} - 9.32^\circ$ in $CHCl_3$.

Nitrosochloride: α -form, m.p. 103–4°. $[\alpha]_D^{18} + 313.4^\circ$. β -Form, m.p. 105–6°. $[\alpha]_D^{18} + 240.3^\circ$.

Nitrolaniline: α -form, m.p. 113°. β -Form, m.p. 153°.

Nitrolpiperidine: α -form, m.p. 93–4°. $[\alpha]_D + 67.5^\circ$. β -Form, m.p. 110–11°. $[\alpha]_D + 60.48^\circ$.

l.

Found in pine needle oil. B.p. 177.6–177.8°/760 mm. (176–176.4°). $D_4^{20} 0.8422$. $n_D^{21} 1.47468$. $[\alpha]_D^{20} - 122.6^\circ$.

Hydrochloride: b.p. 97–8°/11–12 mm. $D^{16} 0.982$. $[\alpha]_D - 40.0^\circ$.

Tetrabromide: cryst. from AcOEt. M.p. 104–5°. $[\alpha]_D - 73.4^\circ$ in $CHCl_3$.

Nitrosochloride: α -form, m.p. 103–4°. $[\alpha]_D - 314.8^\circ$. β -Form, m.p. 105–6°. $[\alpha]_D - 242.2^\circ$.

Nitrolaniline: α -form, m.p. 113°. β -Form, m.p. 153°.

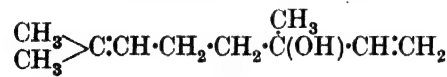
Nitrolpiperidine: α -form, m.p. 93–4°. $[\alpha]_D - 67.6^\circ$. β -Form, m.p. 110–11°. $[\alpha]_D - 60.18^\circ$.

v. Braun, Lemke, *Ber.*, 1923, **56**, 1562.
Ginsberg, *Chem. Zentr.*, 1897, II, 417.
Godlewski, Roshanowitsch, *Chem. Zentr.*, 1889, I, 1241.
Wagner, *Ber.*, 1894, **27**, 1653, 2270.
Tiemann, Semmler, *Ber.*, 1895, **28**, 2145.
Semmler, *Ber.*, 1900, **33**, 1457.
Perkin, *J. Chem. Soc.*, 1904, **85**, 654.
Wallach, *Ber.*, 1907, **40**, 600.
Audrain, *Bulletin de l'institut du pin*, 1927, **33**, 55, 91, 183 (*Bibl.*).

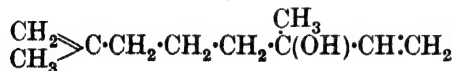
Linalol.

See Linalool.

Linalool (*Linalol*, 2 : 6-dimethyl-2 : 7-octadienol-6 or 2 : 6-dimethyl-1 : 7-octadienol-6)



or



$\text{C}_{10}\text{H}_{18}\text{O}$

MW, 154

dl.

B.p. 197–9°, 89–91°/15 mm. D^{15}_D 0.870. n_D 1.4627. Formed in isomerisation of geraniol by action of heat. $\text{CrO}_3 \rightarrow$ citral + methylheptenone. $\text{KMnO}_4 \rightarrow$ acetone + levulinic acid. Org. acids \rightarrow geraniol. PCl_3 , or HCl in toluene at 100° \rightarrow geranyl chloride. $\text{Na} + \text{EtOH} \rightarrow$ dihydromyrcene. $\text{H} (+ \text{Pt or Pd}) \rightarrow$ dihydro- + tetrahydro-linalool. Dil. H_2SO_4 or $\text{Ac}_2\text{O} \rightarrow$ geraniol, nerol, α -terpineol, and terpin hydrate. $\text{H} \cdot \text{COOH} \rightarrow$ dipentene + terpinene. $\text{S} \rightarrow$ *p*-cymene, dipentene, etc. Perbenzoic acid \rightarrow linalool monoxide + dioxide. $\text{NaHSO}_3 \rightarrow$ $\text{C}_{10}\text{H}_{18}\text{O}_2 \cdot 2\text{NaHSO}_3$.

Phenylurethane: m.p. 63–5°.

d. Coriandrol.

Occurs in oil of linaloe and coriander oil. B.p. 198–200°/760 mm. (194–8°), 85–90°/20 mm. D^{20}_D 0.8679. n_D^{20} 1.4652. $[\alpha]_D^{20} + 19.18^\circ$.

l. Licareol.

Occurs in oil of linaloe, rose, bergamot, neroli, lavender, sage, and thyme. B.p. 197–200°/756 mm., 86–7°/14 mm. D^{20}_D 0.8622. n_D^{20} 1.4604. $[\alpha]_D - 19.37^\circ$ (–20.7°).

Me ether: $\text{C}_{11}\text{H}_{20}\text{O}$. MW, 168. B.p. 189–92°.

Et ether: $\text{C}_{12}\text{H}_{22}\text{O}$. MW, 182. B.p. 192°.

Allyl ether: $\text{C}_{13}\text{H}_{22}\text{O}$. MW, 194. B.p. 103–5°/15 mm. D^{20}_D 0.8722, D^{20}_D 0.8665.

Formyl: b.p. 100–3°/10–11 mm.

Acetyl: b.p. about 200°/762 mm., 115–16°/25 mm., 102–5°/13 mm., 96.5–97°/10 mm. D^{15}_D 0.913 (0.906–7), D^{20}_D 0.8951. n_D^{20} 1.450–1. $[\alpha]_D^{20} - 6.35^\circ$ (–7.7° to –8.3°).

Propionyl: b.p. 115°/10–11 mm. (115–19°/16 mm.).

Butyryl: D^{15}_D 0.897. n_D^{20} 1.4518. $[\alpha]_D^{20} - 10.02^\circ$.

Isobutyryl: D^{15}_D 0.8926. n_D^{20} 1.4487. $[\alpha]_D^{20} - 11.89^\circ$.

Ruzicka, Fornasir, *Helv. Chim. Acta*, 1919, **2**, 182.

Tiemann, *Ber.*, 1898, **31**, 832.

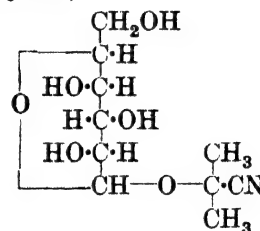
Stephan, *J. prakt. Chem.*, 1899, **60**, 252.

Bertram, *D.R.P.*, 80,711.

Verley, *Bull. soc. chim.*, 1919, **25**, 68.

Lewinsohn, *Chem. Abstracts*, 1924, **18**, 442.

Linamarin (*Phaseolunatin*, glucoside of acetone cyanhydrin)



$\text{C}_{10}\text{H}_{17}\text{O}_6\text{N}$

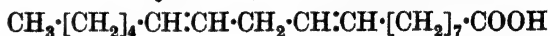
MW, 247

Occurs in flax and *Dimorphotheca ecklonis*. Needles. M.p. 142–3°. $[\alpha]_D^{15} - 29.10^\circ$ in H_2O . Sol. H_2O , EtOH , hot Me_2CO . Spar. sol. Et_2O , CHCl_3 , C_6H_6 . Prac. insol. pet. ether. Dil. acids \rightarrow glucose + acetone + HCN .

Tetra-acetyl: needles. M.p. 140–1°. $[\alpha]_D^{14} - 10.66^\circ$ in Me_2CO .

Fischer, Anger, *Ber.*, 1919, **52**, 854.

Linoleic Acid (*Linolic acid*, 8 : 11-heptadecadiene-1-carboxylic acid, 9 : 12-octadecadienic acid)



$\text{C}_{18}\text{H}_{32}\text{O}_2$

MW, 280

Occurs as glyceride in linseed, cotton seed, maize, hemp, poppy-seed, and other vegetable oils. B.p. 229–30°/16 mm., 228°/14 mm., 202°/1.4 mm. D^{15}_D 0.9026 (0.9038), D^{20}_D 0.9031 (0.9025). n_D^{20} 1.4711, $n_D^{21.5}$ 1.4683. Iodine value 179.9. CNS value 91.2. Oxidised by air. $\text{KMnO}_4 \rightarrow$ caproic, azelaic and oxalic acids + trace of malonic acid. $\text{HI} + \text{P} \rightarrow$ stearic acid. $\text{Br} \rightarrow$ tetrabromostearic acid.

Me ester: $\text{C}_{19}\text{H}_{34}\text{O}_2$. MW, 294. B.p. 211–12°/16 mm., 207–8°/11 mm., 168–70°/1 mm. D^{15}_D 0.8886.

Et ester: $\text{C}_{20}\text{H}_{36}\text{O}_2$. MW, 308. B.p. 270–5°/180 mm. D^{20}_D 0.8865.

Cholesteryl ester: $C_{45}H_{76}O_2$. MW, 644. M.p. 49°. $[\alpha]_D^{20} - 24.3^\circ$.

Chloride: $C_{18}H_{31}OCl$. MW, 298.5. B.p. 167–8°/2.3 mm.

Anhydride: $C_{36}H_{62}O_3$. MW, 542. Liq. Sol. EtOH, Et₂O, CHCl₃, ligroin. $D_4^{25} 0.901$. $n_D^{21} 1.4737$. Iodine value 177.2–178.5.

Tetrabromide: see Tetrabromostearic Acid.

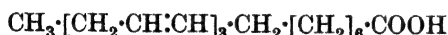
Waterman, van Dijk, *Chem. Zentr.*, 1931, I, 2740.

Haworth, *J. Chem. Soc.*, 1929, 1456.

Coffey, *J. Chem. Soc.*, 1921, 119, 1411.

Rollett, *Z. physiol. Chem.*, 1909, 62, 410.

Linolenic Acid (8 : 11 : 14-Heptadecatriene-1-carboxylic acid, 9 : 12 : 15-octadecatrienic acid)



$C_{18}H_{30}O_2$ MW, 278

A constituent of most drying oils and certain animal fats. α , β , and γ forms found in oil from seed of *Genothera biennis*.

α -Form: natural linolenic acid.

Liq. Sol. EtOH, Et₂O. $D_4^{20} 0.9046$. Br \rightarrow hexabromostearic acid (m.p. 180°). H (+ Ni) \rightarrow stearic acid. $KMnO_4 \rightarrow$ hexahydroxystearic acid.

β -Form.

Liq. Br \rightarrow liq. hexabromostearic acid.

Mixed α + β forms.

B.p. 230–2°/17 mm. $D_4^{18} 0.9141$.

Me ester: $C_{19}H_{32}O_2$. MW, 292. B.p. 207°/14 mm.

Et ester: $C_{20}H_{34}O_2$. MW, 306. B.p. 132–3°/0.001 mm. $D_4^{20} 0.8919$. $n_D^{20} 1.46753$.

γ -Form.

Liq. Br \rightarrow hexabromostearic acid (m.p. 195–6°).

Erdmann, Bedford, *Ber.*, 1909, 42, 1324; *Z. physiol. Chem.*, 1910, 69, 78.

Erdmann, *Z. physiol. Chem.*, 1911, 74, 179. Coffey, *J. Chem. Soc.*, 1921, 119, 1306, 1408.

Smith, West, *Chem. Abstracts*, 1927, 21, 2250.

Heiduschka, Lüft, *Arch. Pharm.*, 1919, 257, 33.

Linolic Acid.

See Linoleic Acid.

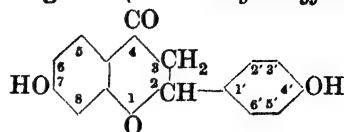
Linusic Acid.

See Hexahydroxystearic Acid.

Linusinic Acid.

See Hexahydroxystearic Acid.

Liquiritigenin (7 : 4'-Dihydroxyflavanone)



$C_{15}H_{12}O_4$ MW, 256

Aglucone of liquiritin. Needles + 1H₂O from EtOH. M.p. 207°. Mg + HCl \rightarrow violet-red col. No col. with FeCl₃. 50% KOH at 170–80° \rightarrow resacetophenone and *p*-hydroxybenzoic acid.

Diacetyl: needles from EtOH. M.p. 186°.

Oxime: yellowish cryst. from H₂O. M.p. 178°.

4'-Glucoside: see Liquiritin.

Shinoda, Ueeda, *Ber.*, 1934, 67, 434.

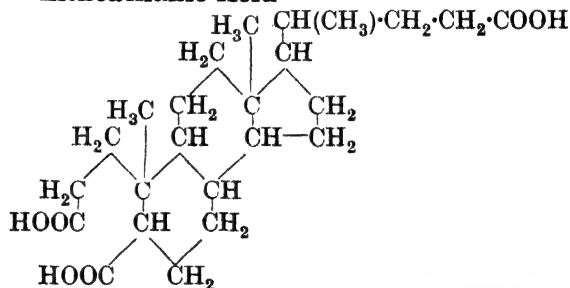
Liquiritin

$C_{21}H_{22}O_9$ MW, 418

4'-Glucoside of liquiritigenin (*q.v.*). Present in *Glycyrrhiza glabra*, Linn., var. *glandilifera*, Regel et Herder. Needles + 1H₂O from EtOH. Aq. or H₂O. M.p. 212°. Mg + HCl in EtOH \rightarrow violet-red col. No col. with alc. FeCl₃. Aq. alc. H₂SO₄ \rightarrow glucose + liquiritigenin. 50% KOH \rightarrow pæonol and *p*-hydroxybenzoic acid.

See above reference.

Lithobilianic Acid



$C_{24}H_{38}O_6$ MW, 422

Prism from AcOH. M.p. 279° (275°). Heat \rightarrow pyrolithobilianic acid.

Tri-Me ester: $C_{27}H_{44}O_6$. MW, 464. Needles from dil. MeOH. M.p. 112°.

Wieland, Weyland, *Z. physiol. Chem.*, 1920, 110, 123.

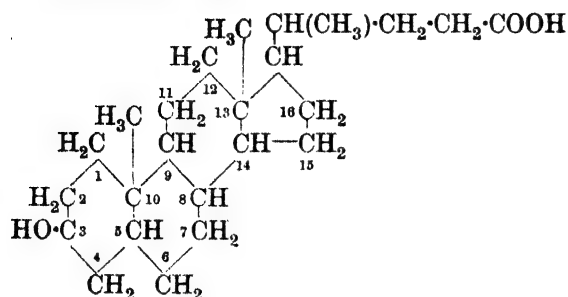
Borsche, Hallwasz, *Ber.*, 1922, 55, 3328.

Wieland, Dane, Scholz, *Z. physiol. Chem.*, 1932, 211, 261.

Wieland, Dane, *Z. physiol. Chem.*, 1932, 212, 48.

Windaus, *Z. physiol. Chem.*, 1932, 213, 147.

Sobotka, *Chemical Reviews*, 1934, 15, 311.

Lithocholic Acid (3-Hydroxycholanolic acid) $C_{24}H_{40}O_3$

MW, 376

Occurs in human and cattle bile. Prisms from dil. EtOH. M.p. 186° . $[\alpha]_D^{20} + 32.14^\circ$ in EtOH. Sol. EtOH, $CHCl_3$, AcOH. Spar. sol. Et_2O , AcOEt. Prac. insol. H_2O , ligroin. Insol. cold $NaHCO_3$, NaOH, but sol. in hot. $CrO_3 \rightarrow$ dehydrolithocholic acid. $HNO_3 \rightarrow$ lithobilianic acid. Red. \rightarrow cholanolic acid. Tasteless.

Me ester: $C_{25}H_{42}O_3$. MW, 390. Needles from dil. MeOH. M.p. 130° .

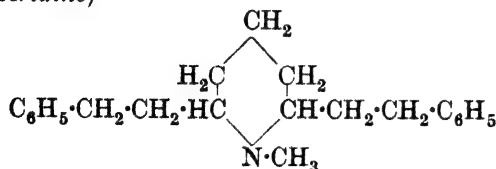
Fischer, *Z. physiol. Chem.*, 1911, **73**, 214, 234.

Wieland, Weyland, *Z. physiol. Chem.*, 1920, **110**, 123.

Borsche, Hallwasz, *Ber.*, 1922, **55**, 3326.

Windaus, *Z. physiol. Chem.*, 1932, **213**, 147.

Sobotka, *Chemical Reviews*, 1934, **15**, 311.

Lobelan (N-Methyl-2:6-di- $[\beta$ -phenylethyl]-piperidine) $C_{22}H_{29}N$

MW, 307

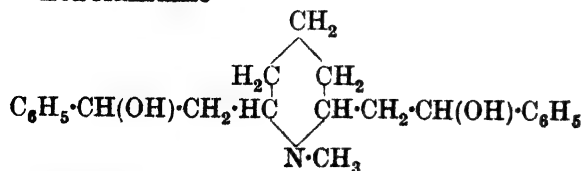
B.p. about 175° in high vacuum.

B, HCl : m.p. $194-5^\circ$.

Methiodide: m.p. 234° .

Wieland, Schopf, Hermesen, *Ann.*, 1925, **444**, 60.

Wieland, Drishaus, *Ann.*, 1929, **473**, 102.

Lobelanidine $C_{22}H_{29}O_2N$

MW, 339

M.p. 150° . $CrO_3 \rightarrow$ lobelanine. $PCl_5 \rightarrow$ dichlorolobelan.

B, HCl : m.p. $135-8^\circ$.

B, HBr : m.p. $188-90^\circ$.

Diacetyl: m.p. $214-15^\circ$. Acetate: m.p. 75° .

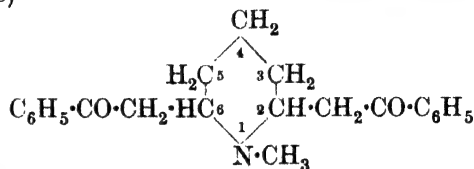
Dibenzoyl: m.p. $109-10^\circ$. B, HCl : m.p. $239-40^\circ$ decomp.

Methiodide: m.p. $173-5^\circ$.

Wieland, Dragendorff, *Ann.*, 1929, **473**, 83.

Scheuing, Winterhalder, *Ann.*, 1929, **473**, 126.

See also first reference above.

Lobelanine (N-Methyl-2:6-diphenacylpiperidine) $C_{22}H_{25}O_2N$

MW, 335

M.p. 99° . Sol. Me_2CO , C_6H_6 , EtOH, AcOH, $CHCl_3$, Py. Spar. sol. Et_2O , pet. ether. Insol. H_2O . $CrO_3 \rightarrow$ benzoic + scopolinic acids. $KMnO_4 \rightarrow$ benzoic acid (2 mols.). Stable to HNO_3 (D 1.4). Heat \rightarrow acetophenone. Alkalis \rightarrow methylphenylcarbinol, benzhydrol, and methylamine. $NaHg \rightarrow$ lobelanidine. $H_2O_2 \rightarrow$ lobelanine N-oxide (m.p. $84-6^\circ$).

B, HCl : cryst. from EtOH. M.p. 196° (188°).

B, HBr : m.p. 188° .

B, HI : m.p. $169-72^\circ$.

$B, HClO_4$: m.p. $173-4^\circ$.

B, HNO_3 : m.p. 160° .

Dioxime: prisms from EtOH. M.p. 209° decomp.

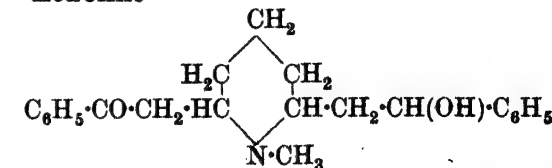
Wieland, Schopf, Hermesen, *Ann.*, 1925, **444**, 49.

Wieland, Dragendorff, *Ann.*, 1929, **473**, 83.

Scheuing, Winterhalder, *Ann.*, 1929, **473**, 126.

Lobelidine.

See dl-Lobeline.

Lobeline $C_{22}H_{27}O_2N$

MW, 337

L.

Occurs in *Lobelia inflata*. Needles from EtOH, Et₂O, or C₆H₆. M.p. 130–1°. $[\alpha]_D^{25} - 42.85^\circ$ in EtOH. Heat \rightarrow acetophenone. CrO₃ \rightarrow lobelanine. NaHg \rightarrow lobelanidine.

B, HCl: needles from Et₂O. M.p. 182°. Sol. CHCl₃.

B, HNO₃: m.p. 170–2°.

Benzoyl: m.p. 155–7° decomp.

dl-. Lobelidine.

Occurs in *Lobelia inflata*. Prisms from EtOH. M.p. 110°.

B, HCl: m.p. 170°.

B, HNO₃: m.p. 159–60° decomp.

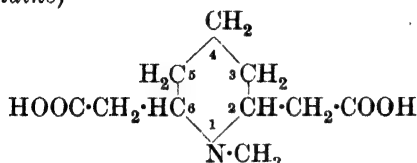
Wieland, Ber., 1921, 54, 1784.

Wieland, Schopf, Hermesen, Ann., 1925, 444, 40.

Wieland, Dragendorff, Ann., 1929, 473, 83.

Wieland, Koschara, Dane, *ibid.*, 118.

Lobelinic Acid (N-Methylpiperidine-2 : 6-diacetic acid, N-methyl-2 : 6-di-[carboxymethyl]-piperidine)



C₁₀H₁₇O₄N MW, 215

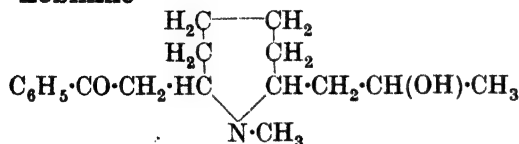
M.p. 225–8° decomp. Sol. H₂O. Spar. sol. org. solvents.

B, H₂AuCl₄: m.p. 215–17° decomp.

Dianilide: m.p. 218–19°.

Wieland, Dragendorff, Ann., 1929, 473, 95.

Lobinine



Probable structure

C₁₈H₂₇O₂N MW, 289

Occurs in *Lobelia inflata*. Not obtained cryst. NaHg \rightarrow lobinol. CrO₃ \rightarrow benzoic and acetic acids.

B, HCl: needles from EtOH-Et₂O or Et₂O-Me₂CO. M.p. 144°. $[\alpha]_D - 106.1^\circ$ in H₂O.

B, HI: m.p. 130°.

B, HClO₄: m.p. 146°. CrO₃ \rightarrow lobinone perchlorate.

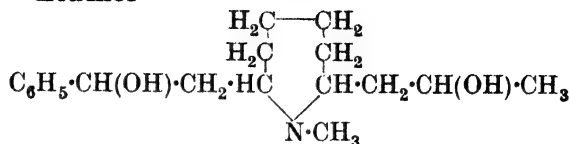
B₂, H₂PtCl₆: decomp. at 190°.

Dict. of Org. Comp.—II.

Hydrochloride of benzoyl deriv.: m.p. 146–7°.
Oxime hydrochloride: m.p. 182°.

Wieland, Ishimasa, Koschara, Ann., 1931, 491, 14.

Lobinol



Probable structure

C₁₈H₂₉O₂N MW, 291

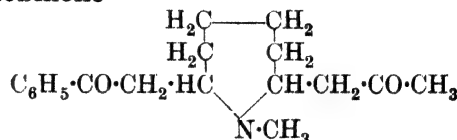
Free base not isolated.

B, HCl: cryst. from EtOH. M.p. 180°.

Methiodide: m.p. 101°.

Wieland, Ishimasa, Koschara, Ann., 1931, 491, 24.

Lobinone



Probable structure.

C₁₈H₂₅O₂N MW, 287

Free base not isolated.

B, HCl: m.p. 94°. $[\alpha]_D - 18.6^\circ$ in H₂O.

B, HClO₄: cryst. from EtOH. M.p. 133°.

Methiodide: m.p. 141°.

Wieland, Ishimasa, Koschara, Ann., 1931, 491, 25.

Lodal (6-β-Methylaminoethylveratric aldehyde)



C₁₂H₁₇O₃N MW, 223

Needles from Me₂CO. M.p. 123–4°. Sol. EtOH, CHCl₃. Spar. sol. H₂O. Spar. sol. other org. solvents. Strongly alkaline to litmus.

B, HCl: yellow needles + 3½H₂O from H₂O. M.p. 61–2°, anhyd. decomp. at 186°. Sol. H₂O, EtOH. Spar. sol. CHCl₃.

B, HBr: yellow needles + 2H₂O from Me₂CO.Aq. M.p. 87–90°, anhyd. 195°.

B, H₂AuCl₄: brown needles from EtOH. M.p. 169°. Spar. sol. H₂O.

Picrate: yellow needles from EtOH. M.p. 169–70°.

Cyano deriv.: prisms from Et₂O.Aq. M.p.

127–8°. Mod. sol. EtOH. Spar. sol. Et₂O. Insol. H₂O.

Pyman, *J. Chem. Soc.*, 1909, **95**, 1270.

Buck, *J. Am. Chem. Soc.*, 1930, **52**, 4121.

Kindler, Peschke, *Arch. Pharm.*, 1932, **270**, 353.

Loiponic Acid.

See Leuponic Acid.

d-Longifolene

C₁₅H₂₄ MW, 204

Sesquiterpene from Indian turpentine. B.p. 254–6°/706 mm., 150–1°/36 mm. D₂₀²⁰ 0.9284. n_D²⁰ 1.495. [α]_D²⁰ + 42.73°.

B, HCl: needles from MeOH. M.p. 59–60°. [α]_D²⁰ + 7.1° in CHCl₃.

B, HBr: prisms from EtOH. M.p. 69–70°.

B, HI: needles from EtOH. M.p. 71°.

Simonsen, *J. Chem. Soc.*, 1920, **117**, 578; 1923, **123**, 2642.

Longifolic Acid

C₁₃H₂₁·COOH

C₁₄H₂₂O₂ MW, 222

Prisms from EtOH.Aq. or pet. ether. M.p. 152–3°. B.p. about 234°/55 mm. Sol. most org. solvents. Spar. sol. formic acid. Insol. H₂O. Very stable.

Me ester: C₁₅H₂₄O₂. MW, 236. Oil. B.p. 170–3°/14 mm.

Amide: C₁₄H₂₃ON. MW, 221. Needles from pet. ether. M.p. 133°. [α]_D²⁰ – 20.5° in MeOH.

Nitrile: C₁₄H₂₁N. MW, 203. Yellow oil. B.p. 145–50°/2 mm.

Urethane: plates from MeOH.Aq. M.p. 76–7°. [α]_D²⁰ – 11.1° in MeOH.

Simonsen, *J. Chem. Soc.*, 1923, **123**, 2652.

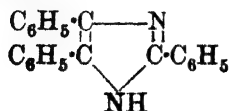
Bradfield, Francis, Simonsen, *J. Chem. Soc.*, 1934, 193.

α-Longifolic Acid. C₁₄H₂₂O₂ MW, 222.

Exists in two forms. (i) Labile. Cryst. from ligroin. M.p. 121–2°. (ii) Needles from ligroin. M.p. 140–2°. [α]_D²⁰ – 31° in EtOH.

Bradfield, Francis, Simonsen, *J. Chem. Soc.*, 1934, 192.

Lophine (2:4:5-Triphenyliminazole, 2:4:5-triphenylglyoxaline)



C₂₁H₁₆N₂

MW, 296

Needles. M.p. 275°. Mod. sol. EtOH, Et₂O. Insol. H₂O. Strong base. Forms metallic derivs.

B, HCl: cryst. + ½ H₂O. M.p. anhyd. 155°.

N-Et: C₂₃H₂₀N₂. MW, 324. Prisms from EtOH. M.p. 234°.

Radziszewski, *Ber.*, 1877, **10**, 70.

Kulisch, *Monatsh.*, 1896, **17**, 302.

Strain, *J. Am. Chem. Soc.*, 1927, **49**, 1996.

Lophophorine.

See under Anhalonine.

Loranthyl Alcohol

C₂₄H₅₀O MW, 354

Constituent of leaves of *Loranthus europæus*, Linn. Cryst. from EtOH. M.p. 71–2°. Sol. Et₂O, Me₂CO, C₆H₆, AcOEt, pet. ether, phenol.

Acetyl: plates from EtOH. M.p. 57–8°.

Benzoyl: cryst. M.p. 56–7°.

Einleger, Fischer, Zellner, *Monatsh.*, 1923, **44**, 287.

Loroglossigenin

C₁₈H₂₂O₈ MW, 366

Leaflets from MeOH. M.p. 77°. Sol. H₂O, Et₂O, CHCl₃. Spar. sol. pet. ether. FeCl₃ → violet col. Does not reduce Fehling's.

Bridel, Delauney, *Compt. rend.*, 1923, **177**, 776.

Loroglossin

C₃₀H₄₂O₁₈ MW, 690

Glucoside found in many species of orchids. Needles from EtOH–Me₂CO. M.p. 137°. [α]_D²⁰ – 45.65° in H₂O. Sol. H₂O. Spar. sol. Me₂CO, AcOEt. Hyd. by dil. H₂SO₄ and emulsin.

See above reference and also

Bourquelot, Bridel, *Compt. rend.*, 1919, **168**, 701.

Lotoflavin

C₁₈H₁₀O₆ MW, 286

Obtained by hyd. of lotusin from *Lotus arabicus*. Yellow cryst. Decomp. at 270–300°. Sol. EtOH, hot AcOH. KOH fusion → phloroglucinol + β-resorecylic acid. Probably a tetrahydroxyflavone.

Tetra-acetyl deriv.: m.p. 176–8°.

Dunstan, Henry, *Proc. Roy. Soc.*, 1900, **67**, 224; 1901, **68**, 374.

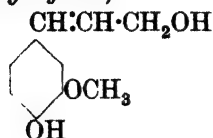
Cullinane, Algar, Ryan, *Proceedings of the Royal Society, Dublin*, 1928, **19**, 77.

Robinson, Venkataraman, *J. Chem. Soc.*, 1929, 62.

Loturine.

See Aribine.

Lubanol (4-Hydroxy-3-methoxyphenylallyl alcohol, ω -hydroxyeugenol)



$\text{C}_{10}\text{H}_{12}\text{O}_3$

MW, 180

Benzoyl deriv.: constituent of Siamese benzoin. Cryst. from pet. ether— Et_2O . M.p. 72° . *Dibromide*: needles. M.p. $119-20^\circ$.

Dibenzoyl: needles. M.p. $79-80^\circ$. No col. with FeCl_3 . *Dibromide*: needles. M.p. $153-4^\circ$. $\text{FeCl}_3 \rightarrow$ green col.

Zincke, Dzimal, *Monatsh.*, 1921, 41, 423.

Zincke, Hanselmayer, Ehmer, *Monatsh.*, 1922, 42, 447.

Luciculine

$\text{C}_{22}\text{H}_{35}\text{O}_3\text{N}$

MW, 361

Cryst. + $1\text{H}_2\text{O}$ from Me_2CO . M.p. $115-17^\circ$. $[\alpha]_D^{11.8} = -11.4^\circ$ in EtOH.

B,HCl: cryst. + $1\frac{1}{2}\text{H}_2\text{O}$ from H_2O . M.p. anhyd. $198-203^\circ$ decomp. $[\alpha]_D = -9.4^\circ$ in H_2O .

Diacetyl: see under Lucidusculine.

Majima, Morio, *Ber.*, 1932, 65, 601.

Lucidusculine

$\text{C}_{24}\text{H}_{37}\text{O}_4\text{N}$

MW, 403

Alkaloid, constituent of *Aconitum lucidusculum*. Plates from MeOH. M.p. $170-1^\circ$. $[\alpha]_D = -95.5^\circ$ in CHCl_3 .

B,HCl: cryst. + $3\frac{1}{2}\text{H}_2\text{O}$ from H_2O . M.p. $98-115^\circ$, anhyd. decomp. at $245-65^\circ$.

B,HBr: cryst. + $1\frac{1}{2}\text{H}_2\text{O}$ from H_2O . M.p. anhyd. $248-50^\circ$. $[\alpha]_D^{28} = -62.7^\circ$ in H_2O .

B,HClO_4: cryst. from EtOH. Decomp. at $260-5^\circ$. $[\alpha]_D^{18} = -70.3^\circ$ in EtOH.

Picrate: cryst. from H_2O . M.p. $173-6^\circ$.

B_2,H_2PtCl_6: needles from H_2O . Decomp. at 225° .

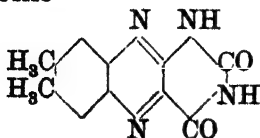
Methiodide: plates from EtOH. M.p. 197° . $[\alpha]_D^{18} = -65.0^\circ$ in EtOH.

Acetyl: diacetyl-luciculine. Plates from EtOH. M.p. $153-7^\circ$. $[\alpha]_D^{18} = -76.0^\circ$ in CHCl_3 .

B,HCl: cryst. + $3\text{H}_2\text{O}$ from H_2O . M.p. $113-17^\circ$, anhyd. decomp. at $139-44^\circ$. $[\alpha]_D^{18} = -50.4^\circ$ in H_2O .

Majima, Morio, *Ber.*, 1932, 65, 600.

Lumichrome



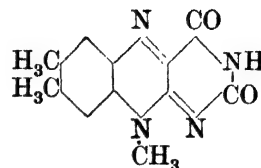
$\text{C}_{12}\text{H}_{12}\text{O}_2\text{N}_4$

MW, 244

Irradiation product of lactoflavine. Needles from CHCl_3 or dil. AcOH. Decomp. about 300° . Sol. hot MeOH, 90% EtOH. Spar. sol. CHCl_3 , H_2O .

Karrer, et al., *Helv. Chim. Acta*, 1934, 17, 1010, 1165.

Lumilactoflavine



$\text{C}_{13}\text{H}_{12}\text{O}_2\text{N}_4$

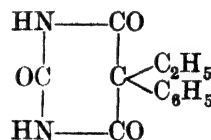
MW, 256

Needles from dil. AcOH. M.p. 330° decomp. $[\alpha]_D \pm 10^\circ$ in H_2O . Sol. H_2O , CHCl_3 . Absorption maxima: 470, 445, 420, 360, 341, 312, 270 m μ in H_2O . NaOH \rightarrow acid, $(\text{C}_{12}\text{H}_{12}\text{O}_3\text{N}_2) + \text{urea}$.

N-Me deriv.: $\text{C}_{14}\text{H}_{14}\text{O}_2\text{N}_4$. MW, 270. Cryst. from AcOH. M.p. 326° .

Wagner-Jauregg, *Angew. Chem.*, 1934, 47, 318 (*Bibl.*).

Luminal (Ethylphenylbarbituric acid, phenobarbital)



$\text{C}_{12}\text{H}_{12}\text{O}_3\text{N}_2$

MW, 232

Cryst. from H_2O . M.p. 174° . Hypnotic and sedative.

Rising, Stieglitz, *J. Am. Chem. Soc.*, 1918, 40, 723.

I.G., E.P., 384,176, (*Chem. Zentr.*, 1933, I, 1479).

Lumisterol

$\text{C}_{28}\text{H}_{44}\text{O}$

MW, 396

First product of ultraviolet irradiation of ergosterol. Further irradiation \rightarrow tachysterol. Needles from $\text{Me}_2\text{CO}-\text{MeOH}$. M.p. 118° . $[\alpha]_{5461}^{19} + 235.4^\circ$ in Me_2CO . Very sol. Me_2CO , Et_2O , CHCl_3 . Sol. MeOH.

Acetyl deriv.: needles from $\text{Me}_2\text{CO}-\text{MeOH}$. M.p. 100° . $[\alpha]_{5461}^{19} + 162.8^\circ$ in Me_2CO . Very sol. Me_2CO , Et_2O , CHCl_3 .

3:5-Dinitrobenzoyl deriv.: pale yellow needles. M.p. $139-41^\circ$. $[\alpha]_{5461}^{20} + 24^\circ$ in C_6H_6 .

Allophanate: cryst. M.p. 217–18°. $[\alpha]_D^{17} + 75.4^\circ$ in CHCl_3 .

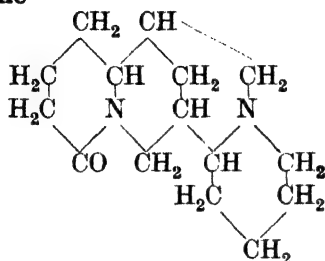
Dimroth, *Ber.*, 1935, **68**, 539.

Windaus, Dithmar, Fernholtz, *Ann.*, 1932, **493**, 259.

Bourdillon *et al.*, *Proc. Roy. Soc.*, 1932, **109**, 488.

Heilbron, Spring, Stewart, *J. Chem. Soc.*, 1935, 1221.

Lupanine



Probable structure

$\text{C}_{15}\text{H}_{24}\text{ON}_2$

MW, 248

d.

Cryst. M.p. 40°. B.p. 185–6°/0.08 mm. $[\alpha]_D + 61.4^\circ$ in Me_2CO . Hygroscopic.

B.HCl: cryst. + $2\text{H}_2\text{O}$ from H_2O . M.p. 127°. $[\alpha]_D + 62.0^\circ$.

B.HI: prisms + $2\text{H}_2\text{O}$ from H_2O . M.p. 189°. $[\alpha]_D + 45.5^\circ$ in H_2O .

B.HAuCl₄: cryst. from H_2O . M.p. 188–9°.

B.HCNS: prisms from H_2O . M.p. 184°. $[\alpha]_D + 55.6^\circ$ in H_2O .

B.HCSN: cryst. from H_2O . M.p. 189–90°. $[\alpha]_D + 47.1^\circ$.

d-Camphorsulphonyl deriv.: prisms + $2\text{H}_2\text{O}$ from Me_2CO . M.p. 112–15°. $[\alpha]_D + 42.5^\circ$ in H_2O .

l.

Oil. B.p. 186–8°/1 mm. $[\alpha]_D - 61.0^\circ$ in Me_2CO .

B.HI: prisms + $2\text{H}_2\text{O}$ from H_2O . M.p. 190°. $[\alpha]_D - 43.6^\circ$.

B.HCNS: cryst. from H_2O . M.p. 183–5°. $[\alpha]_D - 55.3^\circ$ in H_2O .

l-Camphorsulphonyl deriv.: cryst. + $2\text{H}_2\text{O}$ from Me_2CO . M.p. 110–13°. $[\alpha]_D - 45.3^\circ$.

dl.

Constituent of blue lupins. Cryst. from Me_2CO . M.p. 98°. Sol. H_2O , EtOH , Et_2O , CHCl_3 . Insol. ligroin.

B.HCl: cryst. + $2\text{H}_2\text{O}$ from H_2O . M.p. 127–8°, anhyd. 250–2°.

B.HAuCl₄: cryst. from H_2O . M.p. 177–8°.

v. Ammon, Szombathy, E.P., 288,637, (*Chem. Abstracts*, 1929, **23**, 612).

Clemo, Raper, Tenniswood, *J. Chem. Soc.*, 1931, 429.

Clemo, Raper, *J. Chem. Soc.*, 1933, 644.

Couch, *J. Am. Chem. Soc.*, 1934, **56**, 1423.

Luparenol

$\text{C}_{15}\text{H}_{24}\text{O}$

MW, 220

One of higher boiling constituents of essential oil of hops. Odourless liq. B.p. 125–8°/3 mm. D_{20}^{20} 0.9738. n_D^{20} 1.5023. $[\alpha]_D^{20} - 3.7^\circ$. Adds one mol. Br.

Phenylurethane: needles from EtOH.Aq . M.p. 157°.

Chapman, *J. Chem. Soc.*, 1928, 1304.

Luparol

$\text{C}_{16}\text{H}_{26}\text{O}_2$

MW, 250

One of higher boiling constituents of essential oil of hops. Pale yellow liq. with faint odour. B.p. 122–4°/2 mm. D_{20}^{20} 0.9170. n_D^{20} 1.4942. Optically inactive. Alc. $\text{FeCl}_3 \rightarrow$ deep red col. 50% $\text{KOH} \rightarrow$ isovaleric acid + a phenol, ($\text{C}_{11}\text{H}_{16}\text{O}_2$, b.p. 115–17°/4 mm., D_{20}^{20} 0.9448, n_D^{20} 1.4670). Ox. \rightarrow isovaleric acid.

Chapman, *J. Chem. Soc.*, 1928, 1305.

Luparone

$\text{C}_{13}\text{H}_{22}\text{O}$

MW, 194

One of higher boiling constituents of essential oil of hops. B.p. 74–6°/3 mm. D_{20}^{20} 0.8861. n_D^{20} 1.485. $[\alpha]_D^{20} - 0.4^\circ$.

Semicarbazone: cryst. from pet. ether. M.p. 98°.

Chapman, *J. Chem. Soc.*, 1928, 1303.

Lupeol

$\text{C}_{30}\text{H}_{50}\text{O}$

MW, 426

Constituent of several species of gutta percha. Needles from $\text{Me}_2\text{CO-MeOH.Aq}$. M.p. 212–13° (211°). Sol. org. solvents. $[\alpha]_D^{20} + 26.4^\circ$ in CHCl_3 .

Acetyl deriv.: needles from EtOH . M.p. 216° (214°). $[\alpha]_D^{20} + 47.5^\circ$ in CHCl_3 . $[\alpha]_D^{19} + 41.23^\circ$ in CHCl_3 .

Benzoyl deriv.: needles from Me_2CO . M.p. 270° (261.5°). $[\alpha]_D^{19} + 60.4^\circ$ in CHCl_3 .

Cinnamoyl deriv.: leaflets from EtOH . M.p. 249–50° (242°). $[\alpha]_D + 45.5^\circ$ in CHCl_3 . Sol. Et_2O , Me_2CO , CHCl_3 . Spar. sol. hot EtOH . Insol. H_2O .

Phenylurethane: plates. M.p. 231°. $[\alpha]_D^{18.5} + 46.8^\circ$ in CHCl_3 .

Cohen, *Rec. trav. chim.*, 1909, **28**, 368.

Sugii, Sengoku, Taguchi, *Chem. Abstracts*, 1932, **26**, 975.

Lupeone

 $C_{30}H_{48}O$ MW, 424Cryst. M.p. 171–2°. $[\alpha]_D^{25} + 57.3^\circ$ in $CHCl_3$.

Oxime: cryst. from AcOEt. M.p. 274°.

 $[\alpha]_D^{25} + 12.26^\circ$ in $CHCl_3$.

Cyanhydrin: cryst. M.p. 194°.

See previous references.

Lupetidine.

See Dimethylpiperidine.

Lupeylene

 $C_{30}H_{48}$ MW, 408

Cryst. M.p. 173–4°. B.p. 287°/10 mm.

Nögd, *Arch. Pharm.*, 1927, **265**, 1389. α -Lupinane $C_{10}H_{18}N$ MW, 153Apparently exists in two forms both yielding the same picrate. (i) B.p. 75–7°/11 mm. D_4^{23} 0.93. $[\alpha]_D^{25} - 0.65^\circ$ (-0.15°). (ii) B.p. 84–6°/15 mm. $[\alpha]_D^{25} - 9.4^\circ$.

Picrate: m.p. 185°.

Karrer, Vogt, *Helv. Chim. Acta*, 1930, **13**, 1073.Bartholomaüs, Schaumann, D.R.P., 396,508, (*Chem. Zentr.*, 1924, II, 1409).Schöpf, Thöma, *Ann.*, 1928, **465**, 115. β -Lupinane.

B.p. 85–6°/15 mm., 76–7°/11.5 mm.

B,HI: m.p. 261–2°.

B,H₂AuCl₄: m.p. 143–4°.B₂,H₂PtCl₆: m.p. 215°.

Picrate: m.p. 164–5°.

Methiodide: m.p. 214°.

Winterfeld, Kneuer, *Ber.*, 1931, **64**, 152, 2415.Winterfeld, Holschneider, *Ber.*, 1933, **66**, 1751.

See also last reference above.

Lupinic Acid

 $C_{10}H_{17}O_2N$ MW, 183

l.

Plates + 3H₂O from $CHCl_3$. M.p. 255°. Sol. H₂O, EtOH, $CHCl_3$. Insol. Et₂O, Me₂CO.Me ester: $C_{11}H_{19}O_3N$. MW, 197. B.p. 120–2°/10 mm. $[\alpha]_D^{25} - 19.4^\circ$ in MeOH. B₂,H₂PtCl₆: m.p. 210–12°.B,HCl: m.p. 275°. $[\alpha]_D^{25} - 13.1^\circ$ in MeOH.B₂,H₂PtCl₆: red prisms from Me₂CO. M.p. 235°.

Methiodide: needles from EtOH–AcOEt.

M.p. 225–6°. Sol. H₂O, EtOH, $CHCl_3$. Spar. sol. Me₂CO.

Epi-d.

Me ester: b.p. 126°/11 mm. $[\alpha]_D^{18} + 43.5^\circ$ in MeOH. Picrate: m.p. 185°.Amide: $C_{10}H_{18}ON_2$. MW, 182. Cryst. from MeOH. M.p. 228°. $[\alpha]_D^{18} + 41.3^\circ$ in MeOH.Nitrile: $C_{10}H_{16}N_2$. MW, 164. B.p. 120°/11 mm.

Epi-dl.

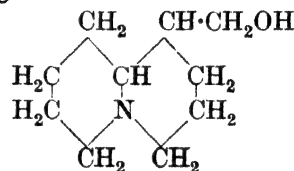
Me ester: b.p. 130°/11 mm. Picrate: m.p. 208°.

Schöpf, Thomä, Schmidt, Braun, *Ann.*, 1928, **465**, 109.Willstätter, Fournéau, *Ber.*, 1902, **35**, 1917.

Lupinidine.

See Spartein.

Lupinine

 $C_{10}H_{19}ON$ MW, 169Alkaloid present in many plants of the *Lupinus* species. Rhombic cryst. from pet. ether. M.p. 68.5–69°. B.p. 255–7° (269–70°). Sol. H₂O, EtOH, Et₂O, $CHCl_3$, C_6H_6 . Spar. sol. pet. ether. $[\alpha]_D^{17} - 19.0^\circ$. Strong base.B,HCl: prisms from EtOH.Aq. M.p. 212–13°. $[\alpha]_D - 14^\circ$ in H₂O.

B,HI: m.p. 140–1°.

Aurichloride: m.p. 211–13°.

Platinichloride: m.p. 166–166.5°.

Phenylurethane: m.p. 98–9°.

Methochloride: m.p. 212–13°.

Methiodide: m.p. 295–6°.

d-Tartrate: prisms from Me₂CO–EtOH. M.p. 171°.

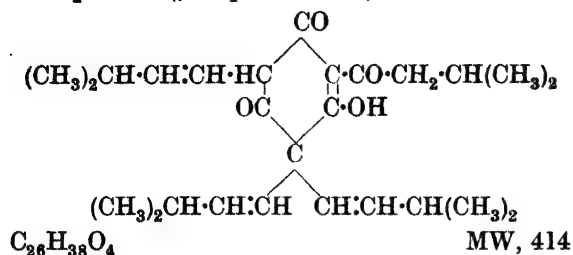
d-Camphorsulphonate: m.p. 181–2°.

Willstätter, Fournéau, *Ber.*, 1902, **35**, 1914.Karrer, Cannel, Tolmer, Widmer, *Helv. Chim. Acta*, 1928, **11**, 1062.Winterfeldt, Kneuer, Holschneider, *Ann.*, 1932, **499**, 109.Couch, *J. Am. Chem. Soc.*, 1934, **56**, 2434. α -Lupulinic Acid.

See Humulone.

 β -Lupulinic Acid.

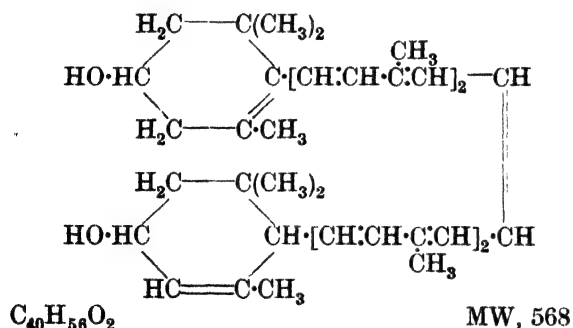
See Lupulone.

Lupulone (β -Lupulinic acid)

One of the bitter acids from hops. Cryst. from MeOH. M.p. 90.5–92°.

Wöllmer, *Ber.*, 1925, 58, 675.

Wieland, *Ber.*, 1925, 58, 2012.

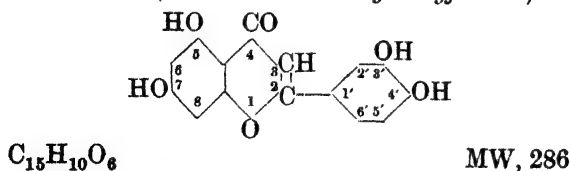
Lutein

Carotenoid pigment present in egg yolk, and leaves. Coppery prisms from MeOH. M.p. 196°. $[\alpha]_{\text{D}}^{25} + 160^\circ$ in CHCl_3 . Absorption bands in CS_2 , 511, 479 and 446 m μ .

Dipalmityl: see Helenien.

Kuhn, Winterstein, Lederer, *Z. physiol. Chem.*, 1931, 197, 141.

Willstätter, Escher, *Z. physiol. Chem.*, 1912, 76, 214.

Luteolin (5 : 7 : 3' : 4'-Tetrahydroxyflavone)

Occurs in many plants, e.g., *Leguminosae*, *Resedaceae*, *Euphorbiaceae*, *Umbelliferae*, *Scrophulariaceae*. Yellow needles + H_2O from EtOH. M.p. 328–30°. Sublimes in high vacuum. Sol. EtOH, Et₂O. Spar. sol. H₂O. Sol. alkalis to yellow sols. KOH fusion \rightarrow phloroglucinol + protocatechuic acid.

7-Me ether: $\text{C}_{16}\text{H}_{12}\text{O}_6$. MW, 300. Leaflets from EtOH. M.p. 270°. Spar. sol. EtOH.

3'-Me ether: m.p. 330–1°.

4'-Me ether: see Diosmetin, Addendum, Vol. I.

7 : 4'-Di-Me ether: $\text{C}_{17}\text{H}_{14}\text{O}_6$. MW, 314. Needles. M.p. 224–5°. Alc. KOH at 160° \rightarrow isovanillic acid.

7 : 3' : 4'-Tri-Me ether: $\text{C}_{18}\text{H}_{16}\text{O}_6$. MW, 328. Yellow needles from EtOH. M.p. 161–3°. Spar. sol. EtOH. Insol. alkalis. *Acetyl*: prisms from EtOH. M.p. 156–8°.

5 : 7 : 3'-Tri-Me-4'-Et ether: $\text{C}_{20}\text{H}_{20}\text{O}_6$. MW, 356. Needles from xylene. M.p. 222°. Sol. EtOH to blue fluor. sol.

7 : 3' : 4'-Tri-Et ether: $\text{C}_{21}\text{H}_{22}\text{O}_6$. MW, 370. Yellow needles from EtOH. M.p. 140–3°. Insol. cold EtOH, alkalis. *Acetyl*: needles from EtOH. M.p. 183–5°. Spar. sol. EtOH to blue fluor. sol.

Tetra-Et ether: $\text{C}_{22}\text{H}_{24}\text{O}_6$. MW, 398. Needles. M.p. 153–5°. HI \rightarrow luteolin.

Tetra-acetyl: needles from EtOH. M.p. 222–4°. Spar. sol. EtOH.

7 : 3' : 4'-Tribenzoyl: needles. M.p. 219°. Spar. sol. EtOH, C_6H_6 . Insol. H₂O.

Tetrabenzoyl: needles from EtOH. M.p. 200–201°. Spar. sol. C_6H_6 .

Perkin, Horsfall, *J. Chem. Soc.*, 1900, 77, 1315.

Kostanecki, Rózczycki, Tambor, *Ber.*, 1900, 33, 3417.

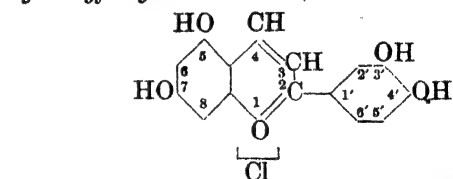
Vongerichten, *Ber.*, 1900, 33, 2339.

Diller, Kostanecki, *Ber.*, 1901, 34, 1452.

Perkin, *J. Chem. Soc.*, 1896, 69, 800.

Fleischer, *Ber.*, 1899, 32, 1186.

Lovecy, Robinson, Sugawara, *J. Chem. Soc.*, 1930, 817.

Luteolinidin chloride (5 : 7 : 3' : 4'-Tetrahydroxyflavylium chloride)

Reddish-brown prisms from EtOH. Does not melt at 300°. Sol. conc. H₂SO₄ with green fluor. Alc. FeCl₃ \rightarrow bluish-violet col.

3'-Me ether: $\text{C}_{16}\text{H}_{13}\text{O}_6\text{Cl}$. MW, 320.5. Reddish-violet needles from EtOH. Decomp. at 255°. Insol. H₂O, Et₂O. Alc. FeCl₃ \rightarrow blue col.

Tetra-Me ether: $\text{C}_{19}\text{H}_{19}\text{O}_6\text{Cl}$. MW, 362.5. Orange-red needles. *Ferrichloride*: red needles from AcOH. M.p. 206–7°.

5-Benzoyl: crimson cryst. from EtOH. Decomp. at 182°. Alc. $\text{FeCl}_3 \rightarrow$ dark red col. \rightarrow violet on addn. of H_2O .

Pratt, Robinson, *J. Chem. Soc.*, 1925, 127, 1135.

Asahina, Nakagome, Inubuse, *Ber.*, 1929, 62, 3018.

Léon, Robinson, *J. Chem. Soc.*, 1931, 2734.

Lutidine.

See Dimethylpyridine.

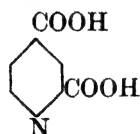
Lutidine-carboxylic Acid.

See Dimethylnicotinic Acid and Dimethylpicolinic Acid.

Lutidine-dicarboxylic Acid.

See Dimethylcinchononic Acid and Dimethyldinicotinic Acid.

Lutidinic Acid (*Pyridine-2:4-dicarboxylic acid*)



$\text{C}_7\text{H}_5\text{O}_4\text{N}$

MW, 167

Leaflets + $1\text{H}_2\text{O}$ from H_2O . M.p. anhyd. 248–50° (235°). Sol. H_2O , hot EtOH. Insol. Et_2O , C_6H_6 , CS_2 . Alc. KOH \rightarrow violet-red col.

Di-Me ester: $\text{C}_9\text{H}_9\text{O}_4\text{N}$. MW, 195. Needles from pet. ether. M.p. 58°.

Di-phenyl ester: $\text{C}_{19}\text{H}_{13}\text{O}_4\text{N}$. MW, 319. M.p. 136°.

Dichloride: $\text{C}_7\text{H}_3\text{O}_2\text{NCl}_2$. MW, 204. Needles. M.p. 54–6°. Sol. C_6H_6 . Spar. sol. pet. ether.

Diamide: $\text{C}_7\text{H}_7\text{O}_2\text{N}_3$. MW, 165. Needles from H_2O . M.p. 254–5°. Sol. amyl alcohol, PhNO_2 . Insol. EtOH, Et_2O , C_6H_6 .

Dihydrazide: $\text{C}_7\text{H}_9\text{O}_2\text{N}_5$. MW, 195. Needles from EtOH.Aq. M.p. 256° decomp. (rapid heat.). Sol. H_2O . Insol. MeOH, EtOH. Reduces Fehling's and Tollen's reagents.

Diazide: $\text{C}_7\text{H}_5\text{O}_2\text{N}_7$. MW, 217. Cryst. from Et_2O . Decomp. at 98° (rapid heat.).

Meyer, Tropsch, *Monatsh.*, 1914, 35, 189.

α -Lutidone.

See 6-Hydroxy-2:4-dimethylpyridine.

γ -Lutidone.

See 4-Hydroxy-2:6-dimethylpyridine.

ψ -Lutidostyryl.

See 6-Hydroxy-2:4-dimethylpyridine.

Lycaconine (*Anthranoyl-lycoctinine*)

$\text{C}_{32}\text{H}_{44}\text{O}_6\text{N}_2$

MW, 584

Yellow plates from EtOH. M.p. 154–5°. Sol. CHCl_3 . Spar. sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O , pet. ether. Alkalis \rightarrow lycoctinine + anthranilic acid.

$\text{B}, 2\text{HClO}_4$: m.p. above 235°.

Schulz, Bierling, *Arch. Pharm.*, 1913, 251, 8.

Lycaconitine

$\text{C}_{27}\text{H}_{34}\text{O}_6\text{N}_2$

MW. 482

Constituent of roots of *Aconitum lycoctonum*. Amorph. M.p. 111–14°. Sol. EtOH, C_6H_6 , CHCl_3 , CS_2 . Spar. sol. H_2O , Et_2O . $[\alpha]_D^{20} + 31.5^\circ$. H_2O at 100° \rightarrow lycoctonic acid.

Dragendorff, Spohn, *Jahresber. Fortschr. Chem.*, 1884, 1394.

Lycetol.

See under 2:5-Dimethylpiperazine.

Lycine.

See Betaine.

Lycoctinine

$\text{C}_{25}\text{H}_{39}\text{O}_7\text{N}$

MW, 465

Needles + $1\text{H}_2\text{O}$ from dil. EtOH. M.p. 131–3°, decomp. at 137°. Sol. EtOH, CHCl_3 . Spar. sol. C_6H_6 , Et_2O , H_2O . Insol. pet. ether. $[\alpha]_D^{20} + 49.64^\circ$ in EtOH.

B, HCl : prisms + $1\text{H}_2\text{O}$. M.p. 75°.

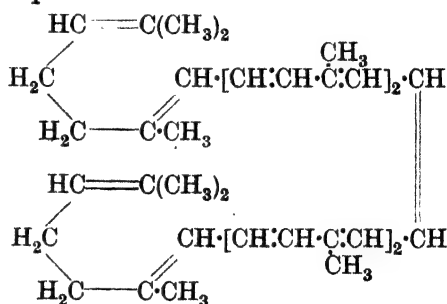
B, HBr : prisms + $2\text{H}_2\text{O}$. M.p. 88–9°.

B, HClO_4 : prisms + $1\frac{1}{2}\text{H}_2\text{O}$. M.p. 68–9°.

Methiodide: needles. M.p. 178°.

Schulz, Bierling, *Arch. Pharm.*, 1913, 251, 8.

Lycopene



$\text{C}_{40}\text{H}_{56}$

MW, 536

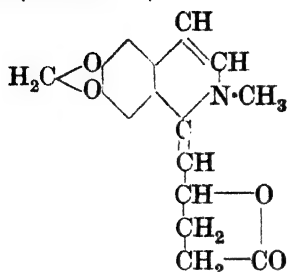
Carotenoid pigment present in tomatoes (*Lycopersicum esculentum*), dog rose, many berries and fruits. Prisms from pet. ether. M.p. 175° (173°). Sol. CHCl_3 , CS_2 , hot C_6H_6 . Spar. sol. EtOH, pet. ether. Absorption bands in CS_2 , 548, 507.5 and 477 m μ .

Willstätter, Escher, *Z. physiol. Chem.*, 1910, 64, 47.

Kuhn, Grundmann, *Ber.*, 1932, 65, 1880.

Karrer, Helfenstein, Pieper, Wettstein, *Helv. Chim. Acta*, 1931, 14, 435.

Winterstein, *Angew. Chem.*, 1934, 47, 315.

Lycorine (*Narcissine*)

Probable structure

 $C_{16}H_{17}O_4N$

MW, 287

Alkaloid found in plants of the order *Amaryllidaceae*. Short prisms from EtOH. M.p. 280°. $[\alpha]_D^{25} - 120^\circ$ in EtOH. Spar. sol. EtOH, Et₂O, CHCl₃. Insol. H₂O. Alkaline to litmus. Salts easily hyd.

B, HCl: needles + 1H₂O from H₂O. M.p. 206° (217°) decomp. $[\alpha]_D + 43^\circ$.

Picrate: yellow leaflets from H₂O. M.p. 196°.

Perchlorate: plates from H₂O. M.p. 230° decomp.

Kondo, Tomimura, *Chem. Abstracts*, 1928, 22, 2948.

Gorter, *Chem. Zentr.*, 1920, III, 842.

Asahing, Sugii, *Arch. Pharm.*, 1913, 251, 357.

Lygosin.

See 2 : 2'-Dihydroxydistyryl Ketone.

Lysergic Acid

 $C_{16}H_{16}O_2N_2$

MW, 268

Leaflets + H₂O from H₂O. M.p. 238° decomp. $[\alpha]_D^{20} + 40^\circ$ in Py. Sol. Py. Spar. sol. most org. solvents. Amphoteric. Gives characteristic blue Keller test of ergot alkaloids.

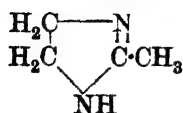
B, HCl: cryst. from MeOH. M.p. 208–10° decomp.

B₂, H₂SO₄: cryst. from H₂O. M.p. 220° decomp.

Me ester: $C_{17}H_{18}O_2N_2$. MW, 282. Leaflets from C₆H₆. M.p. 168°. Sol. EtOH, Et₂O, Me₂CO. Insol. pet. ether.

Jacobs, Craig, *J. Biol. Chem.*, 1934, 104, 549; 106, 396.

Lysidine (2-Methyl-4 : 5-dihydroglyoxaline, 2-methyl-4 : 5-dihydroiminazole)

 $C_4H_8N_2$

MW, 84

Cryst. M.p. 105° (85°). B.p. 195–8° (221–4°). Sol. H₂O, EtOH. Prac. insol. Et₂O. Used as uric acid eliminant.

B, HCl, 2HgCl₂: prisms from hot H₂O. M.p. 162–3°.

Ladenburg, *Ber.*, 1894, 27, 2952; 1895, 28, 3068.

Lysine (1 : 5-Diamino-n-caproic acid)

$H_2N \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH(NH_2) \cdot COOH$

 $C_6H_{14}O_2N_2$

MW, 146

d-.

Obtained by hyd. of casein, egg albumen, fibrin, gelatin, blood corpuscles and seeds of some conifers. Found in beet molasses. Needles from H₂O or dil. EtOH. Darkens at 210°. M.p. 224–5° decomp. $[\alpha]_D^{20} + 14.6^\circ$. Very sol. H₂O. Prac. insol. EtOH. $k_a = 4.9 \times 10^{-12}$ at 0°, 2.95×10^{-11} at 25°; $k_{b1} = 7.4 \times 10^{-6}$ at 0°, 0.89×10^{-5} at 25°; $k_{b2} = 1.82 \times 10^{-13}$ at 0°, 1.52×10^{-12} at 25°. Isoelectric point p_H 10.56° at 0°, 9.74 at 25°. Ba(OH)₂ at 150° or HCl at 165–70° → dl-lysine. Heat → pentamethylenediamine. Ba(MnO₄)₂ → glutaria, glutamic, oxalic, and hydrocyanic acids. KOH fusion → propionic and acetic acids.

B, HCl: m.p. 235–6°. Acid reaction.

B, 2HCl: cryst. from dil. HCl. M.p. 193°. $[\alpha]_D^{20} + 15.3^\circ$ in H₂O. Neutral reaction.

5-Benzoyl: m.p. 235°. $[\alpha]_D^{20} + 20.12^\circ$ in HCl.Aq.

1 : 5-Dibenzoyl: see d-Lysuric Acid.

Benzylidene deriv.: m.p. 205–6°.

B, H₂PtCl₆, EtOH: yellow prisms. Decomp. at 120°.

B₂, 3HAuCl₄, HCl, 2H₂O: sinters at 120°. M.p. 152–5°.

Picrate: cryst. from H₂O. M.p. 266° decomp. Spar. sol. EtOH.

dl-.

B, HCl: m.p. 235–6°.

B, 2HCl: cryst. M.p. 188–90° (183–6°). Sol. H₂O.

1-Benzoyl: needles. M.p. 235° (235–49°). Sol. hot H₂O. Spar. sol. EtOH. Insol. Et₂O, CHCl₃, C₆H₆.

5-Benzoyl: cryst. from H₂O. M.p. 254° (263–8°).

1 : 5-Dibenzoyl: see dl-Lysuric Acid.

1-Benzoyl-5-p-toluenesulphonyl: m.p. 140°.

5-Benzoyl-1-p-toluenesulphonyl: m.p. 199°.

1-Me: *B, HCl*, m.p. 244–5°. *B, HI*: m.p. 239–41°. *Picrolonate*: m.p. 243–5°.

5-Me: *picrate*, m.p. 227° decomp. *Picrolonate*: m.p. 228° decomp.

1-Me-5-benzoyl: m.p. 234°.

5-Me-5-benzoyl: m.p. 232°.

Me ester: $C_7H_{16}O_2N_2$. MW, 160. Syrup. Alkaline reaction. $BHCl$, m.p. 218° decomp. Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O , C_6H_6 .

Picrate: yellow needles from H_2O . Decomp. at 230°.

$B,2HAuCl_4, \frac{1}{2}H_2O$: m.p. 173–6° decomp.

Eck, Marvel, *J. Biol. Chem.*, 1934, **106**, 387.

Vickery, Leavenworth, *J. Biol. Chem.*, 1928, **76**, 437.

Cox, King, Berg, *J. Biol. Chem.*, 1929, **81**, 755.

Foster, Schmidt, *J. Am. Chem. Soc.*, 1926, **48**, 1712.

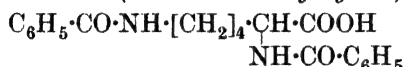
van Slyke, *J. Biol. Chem.*, 1914, **16**, 531.

Fischer, Weigert, *Ber.*, 1902, **35**, 3772.

Sörensen, *Chem. Zentr.*, 1903, **II**, 35.

v. Braun, *Ber.*, 1909, **42**, 839.

Lyssuric Acid (N : N'-Dibenzoyl-lysine)



$C_{20}H_{22}O_4N_2$ MW, 354

d-.

Cryst. M.p. 149–50° (144–5°). $[\alpha]_D^{20} + 3.06^\circ$ in 0.1N/NaOH, $[\alpha]_D^{16} - 8.59^\circ$ in MeOH. Sol. EtOH. Spar. sol. cold H_2O . Conc. HCl or $Ba(OH)_2 \rightarrow$ 1- and 5-benzoyl-lysine.

Me ester: $C_{21}H_{24}O_4N_2$. MW, 368. M.p. 114°. $[\alpha]_D^{17} - 18.6^\circ$ in MeOH.

Et ester: $C_{22}H_{26}H_4N_2$. MW, 382. M.p. 101°. $[\alpha]_D^{19} - 16.2^\circ$ in EtOH.

$NaA, C_{20}H_{22}O_4N_2, H_2O$: m.p. 108–9°.

$BaA_2, 2C_{20}H_{22}O_4N_2, 2H_2O$: needles. M.p. 144–8°.

$BaA_2, 1\frac{1}{2}H_2O$: m.p. 168°. Sol. H_2O , hot EtOH.

dl-.

Plates from Me_2CO . M.p. 145–6°. Sol. EtOH, Me_2CO . Spar. sol. H_2O , Et_2O , C_6H_6 . Conc. HCl or $Na(OH)_2 \rightarrow$ 1- and 5-benzoyl-lysine.

Karrer, Escher, Widmer, *Helv. Chim. Acta*, 1926, **9**, 316.

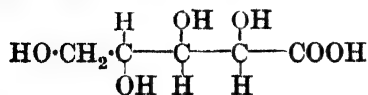
Karrer, Ehrenstein, *Helv. Chim. Acta*, 1926, **9**, 326.

Drechsel, *Ber.*, 1895, **28**, 3190.

Fischer, Weigert, *Ber.*, 1902, **35**, 3776.

v. Braun, *Ber.*, 1909, **42**, 845.

Lyxonic Acid



$C_6H_{10}O_6$

MW, 166

d-.

M.p. 144°. $[\alpha]_D^{20} 6.6^\circ$ + initially, 52.7° on standing. Sol. H_2O . Spar. sol. EtOH. NaHg in dil. $H_2SO_4 \rightarrow$ d-lyxose. Py + H_2O at 135° \rightarrow d-xyliconic acid. Evaporation of aq. sol. \rightarrow lyxonolactone.

K salt, H_2O : m.p. 166°. $[\alpha]_D^{20} - 8.5^\circ$.

γ -Lactone: m.p. 110°. $[\alpha]_D^{20} + 77.7^\circ$ in H_2O .

Tri-Me- δ -lactone: b.p. 105°/0.02 mm. $n_D^{18} 1.4620$. $[\alpha]_D^{19} + 35.5^\circ$ initially, -9.3° on standing in H_2O .

Quinine salt: needles from EtOH. M.p. 169°. $[\alpha]_D^{20} - 109.8^\circ$.

Brucine salt: prisms or plates from EtOH. M.p. 174–6°. Needles + H_2O from dil. EtOH. M.p. 168–70°. Sol. H_2O . $[\alpha]_D^{20} - 27.57^\circ$.

Hydrazide: m.p. 188°. $[\alpha]_D^{14} - 3.6^\circ$ in H_2O .

Phenylhydrazide: m.p. 164°. $[\alpha]_D^{20} - 13.72^\circ$.

Rehorst, *Ann.*, 1933, **503**, 157.

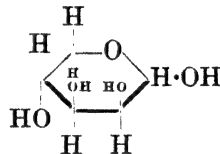
Fischer, Bromberg, *Ber.*, 1896, **29**, 581.

Maurer, Müller, *Ber.*, 1930, **63**, 2072.

Lyxosamine.

See Lyxosimine.

Lyxose



$C_5H_{10}O_5$

MW, 150

d-.

α -Form:

Cryst. from EtOH– Et_2O . M.p. 106–7° (101°). Hygroscopic. Very sol. H_2O . Sol. 37.97 parts EtOH at 17°. Exhibits mutarotation. $[\alpha]_D^{20} + 5.5^\circ$ initially, -14° on standing. Br water \rightarrow d-lyxonic acid. NaHg \rightarrow d-arabitol. Dist. with HCl \rightarrow furfural. MeOH + $NH_3 \rightarrow$ d-lyxosimine. HCN followed by hyd. \rightarrow d-galactonic and d-talonic acids. Reduces Fehling's. Does not undergo fermentation. Gives the same phenylosazone as d-xylose.

Phenylosazone: m.p. 164°. Decomp. at 167°.

p-Bromophenylhydrazone: m.p. 161.5° (156–7°).

p-Nitrophenylhydrazone: m.p. 172°.

Phenyl-p-chlorobenzylhydrazone: m.p. 134–5°. $[\alpha]_D + 29.2^\circ$ in MeOH.

Dibenzylhydrazone: m.p. 115–18°. $[\alpha]_D + 27.7^\circ$ in MeOH.

Me-lyxoside: cryst. from AcOEt. M.p. 109°. $[\alpha]_D + 59^\circ$.

2 : 3 : 4-Tri-Me-Me-lyxoside: b.p. about 70°/0.02 mm. $n_D^{14} 1.4460$. $[\alpha]_D^{20} + 10^\circ$ in H_2O .

2:3:4-*Tri-Me-lyxose*: needles from pet. ether. M.p. 79°. $[\alpha]_D^{20}$ — 22° in H₂O.

β -Form:

Needles from EtOH. M.p. 117–18°. $[\alpha]_D$ — 70° in H₂O initially, — 14° on standing. Very sol. H₂O. Spar. sol. EtOH. The osazone and hydrazones are identical with those of the α -form.

l-.

Cryst. M.p. 105°. Hygroscopic. $[\alpha]_D$ — 5.8° initially, — 13.5° on standing.

p-Bromophenylhydrazone: m.p. 157°.

p-Nitrophenylhydrazone: m.p. 172°.

dl-.

Cryst. M.p. 95°.

Haworth, Hirst, *J. Chem. Soc.*, 1928, 1228.

Hirst, Smith, *J. Chem. Soc.*, 1928, 3147.

van Ekenstein, Blanksma, *Chem. Weekblad.*, 1914, 11, 189.

Clark, *J. Biol. Chem.*, 1917, 31, 605.

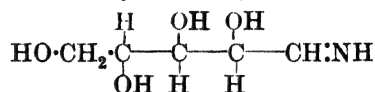
Weerman, *Rec. trav. chim.*, 1917–8, 37, 31.

Ruff, Ollendorff, *Ber.*, 1900, 33, 1799.

Wohl, List, *Ber.*, 1897, 30, 3105.

Fischer, Bromberg, *Ber.*, 1896, 29, 584.

Lyxosimine (*Lyxosamine*)



C₅H₁₁O₄N

MW, 149

d-.

Cryst. M.p. 142–3°. $[\alpha]_D^{25}$ — 54.5° in H₂O initially, — 44.5° on standing.

Levene, La Forge, *J. Biol. Chem.*, 1915, 22, 333.

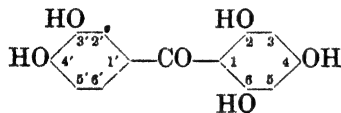
Levene, *J. Biol. Chem.*, 1916, 24, 62.

M

M Acid.

See 1-Amino-5-naphthol-7-sulphonic Acid.

Maclurin (2:4:6:3':4'-*Pentahydroxybenzophenone*)



C₁₃H₁₀O₆

MW, 262

Yellow prisms + 1H₂O from H₂O. M.p. anhyd. 220–2°. Very sol. EtOH, Et₂O. Spar. sol. H₂O. Conc. H₂SO₄ → yellow col. FeCl₃ → dark green col.

3'-*Me ether*: C₁₄H₁₂O₆. MW, 276. Yellow needles + 1H₂O from H₂O. Decomp. above 200°. Sol. EtOH, Et₂O. Spar. sol. H₂O. Alc. FeCl₃ → brown col.

2:4:6-*Tri-Me ether*: cotogenin. C₁₆H₁₆O₈. MW, 304. Leaflets from EtOH. M.p. 217°. Spar. sol. EtOH. Alc. FeCl₃ → green col. *Diacetyl*: prisms. M.p. 120°.

Penta-Me ether: C₁₈H₂₀O₈. MW, 332. Plates from EtOH or C₆H₆-ligroin. M.p. 157°. Sol. warm EtOH, Et₂O, AcOH.

Ciamician, Silber, *Ber.*, 1893, 26, 783.

Hoesch, v. Zarrzchi, *Ber.*, 1917, 50, 467.

Nierenstein, *J. Indian Chem. Soc.*, 1931, 8, 143.

Macralstonidine

C₄₁H₅₀O₈N₄

MW, 646

Alkaloid of *Alstonia macrophylla*. Plates from EtOH. Decomp. about 270°. $[\alpha]_D$ + 174.5° in C₆H₆. Hygroscopic.

B,2HCl: needles from EtOH. M.p. 326° decomp. $[\alpha]_D$ + 136.5° in H₂O.

Sharp, *J. Chem. Soc.*, 1934, 1231.

Macralstonine

C₄₄H₅₄O₅N₄

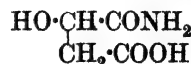
MW, 718

Alkaloid of *Alstonia macrophylla*. Cryst. from EtOH-Py. M.p. 293° decomp. Sol. CHCl₃, Py. Spar. sol. Me₂CO. Insol. other org. solvents. $[\alpha]_D$ + 27.5° in CHCl₃.

B,H₂SO₄: prisms from MeOH. M.p. about 263° decomp. $[\alpha]_D$ — 36.8° in H₂O.

See previous reference.

α -Malamic Acid (α -Malamidic acid, malic acid 1-amide)



C₄H₇O₄N

MW, 133

l-.

Me ester: C₅H₉O₄N. MW, 147. Cryst. M.p. 66–7°. $[\alpha]_D$ — 48.48° in MeOH. Insol. Et₂O.

Et ester: $C_6H_{11}O_4N$. MW, 161. Cryst. M.p. 102–3°. $[\alpha]_D - 42.0^\circ$ in MeOH. Sol. EtOH. Insol. Et₂O.

Benzylamide: m.p. 131–2°. $[\alpha]_D - 42.62^\circ$ in MeOH.

d.

Benzylamide: m.p. 131°. Sol. EtOH, MeOH. Spar. sol. H₂O. Insol. Et₂O. $[\alpha]_D + 42.40^\circ$ in MeOH.

dl.

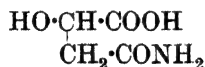
Me ester: prisms from EtOH. M.p. 146°. Sol. H₂O, EtOH, Et₂O. *Benzoyl*: cryst. M.p. 78–80°. Sol. Et₂O.

Et ester: *benzoyl*, cryst. from Et₂O. M.p. 96–7°. Very sol. H₂O. Sol. EtOH, Et₂O.

Lutz, *Chem. Zentr.*, 1900, II, 1013; *Ber.*, 1902, 35, 2462; 1908, 41, 842.

Curtius, Koch, *J. prakt. Chem.*, 1888, 38, 479.

β -Malamic Acid (*β -Malamidic acid, malic acid 2-amide*)



$C_4H_7O_4N$ MW, 133

l.

Cryst. M.p. 149°. Sol. H₂O. $D_{44}^{18} 1.576$. $[\alpha]_D + 9.33^\circ$ in H₂O. $k = 2.86 \times 10^{-4}$ at 25°.

N-Benzyl: m.p. 130–1°. $D_{44}^{18} 1.349$. $[\alpha]_D^{20} - 13.8^\circ$ in MeOH.

N-Dibenzyl: prisms. M.p. 170°. $[\alpha]_D - 61.6^\circ$ in EtOH.

Me ester: $C_5H_9O_4N$. MW, 147. M.p. 75–6°. $[\alpha]_D - 12.5^\circ$ in MeOH. *N-Benzyl*: leaflets from EtOH. M.p. 105°. Insol. Et₂O. $[\alpha]_D^{20} - 12.8^\circ$ in MeOH.

* *d.*

Plates from H₂O. M.p. 149°. $D_{44}^{18} 1.577$. $[\alpha]_D + 9.70^\circ$ in H₂O. $k = 2.86 \times 10^{-4}$ at 25°. Alkalis \rightarrow *d*-malic acid.

Me ester: cryst. M.p. 75–6°. $[\alpha]_D + 12.7^\circ$ in MeOH. *N-Benzyl*: m.p. 105°. Sol. EtOH. Insol. Et₂O. $[\alpha]_D^{20} + 12.8^\circ$ in MeOH.

N-Benzyl: plates. M.p. 130–1° decomp. Sol. EtOH, MeOH. Insol. Et₂O. $D_{44}^{18} 1.347$. $[\alpha]_D^{20} + 13.6^\circ$ in MeOH.

Benzylamide: m.p. 125–6°. $[\alpha]_D + 44.56^\circ$ in MeOH.

Cinchonine salt: m.p. 165–7°.

dl.

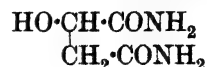
Cryst. M.p. 148°. Spar. sol. MeOH, EtOH. Insol. Et₂O. $D_{44}^{18} 1.526$.

Me ester: cryst. M.p. 113°. Spar. sol. MeOH.

N-Benzyl: m.p. 131°. $D_{44}^{18} 1.360$. Heat at m.p. \rightarrow benzylmaleimide.

See previous references.

Malamide (*Malic acid diamide*)



$C_4H_8O_3N_2$ MW, 132

d.

Cryst. M.p. 156–7°. $[\alpha]_D^{20} + 37.9^\circ$ in H₂O.

NN'-Dibenzyl: plates. M.p. 157°. $[\alpha]_D^{18} + 36.7^\circ$ in MeOH.

l.

Prisms from H₂O. M.p. 156–8°. $[\alpha]_D^{20} - 38.0^\circ$ in H₂O.

Me ether: *l*-methoxysuccinic diamide. $C_5H_{10}O_3N_2$. MW, 146. Prisms from MeOH. M.p. 178–9°.

NN'-Dibenzyl: prisms from C₆H₆. M.p. 157°. Sol. EtOH, MeOH. Spar. sol. H₂O. $[\alpha]_D^{18} - 36.9^\circ$ in MeOH. $[\alpha]_D^{18} - 32.4^\circ$ in Py.

dl.

Cryst. M.p. 163–4°.

Me ether: *dl*-methoxysuccinic diamide. Cryst. M.p. 175°. Sol. H₂O, hot EtOH. Insol. Et₂O.

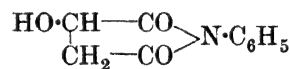
Lutz, *Chem. Zentr.*, 1900, II, 1013; *Ber.*, 1904, 37, 2127.

Freudenberg, *Ber.*, 1914, 47, 2031.

Malamidic Acid.

See Malamic Acid.

Malanil



$C_{10}H_9O_3N$ MW, 191

Needles from H₂O. M.p. 170°. Sol. H₂O, EtOH, Et₂O. $[\alpha]_D - 34^\circ$. Heat at 120° \rightarrow fumaric acid + fumaranilide.

Acetyl: cryst. M.p. 157°. Sol. EtOH.

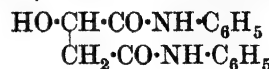
Arppe, *Ann.*, 1855, 96, 110.

Bischoff, *Ber.*, 1891, 24, 2007.

Malanilic Acid.

See under Malic Acid.

Malanilide (*l-Malic acid dianilide*)



$C_{16}H_{16}O_3N$ MW, 270

Cryst. from EtOH. M.p. 198°. Spar. sol. EtOH, Et₂O. $[\alpha]_D - 101.1^\circ$ in Py.Aq., -60.66° in AcOH.

Me ether: methoxysuccinic dianilide. $C_{17}H_{18}O_3N$. MW, 284. Needles from C₆H₆. M.p. 158–9°.

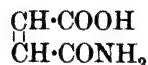
Acetyl: cryst. from MeOH. M.p. 177°.

Bischoff, Nastvogel, *Ber.*, 1890, **23**, 2040.
Freundenberg, Noë, *Ber.*, 1925, **58**, 2406.

Malealdehyde.

See Maleic Dialdehyde.

Maleamic Acid (*Maleic acid monoamide, maleinamic acid*)



$\text{C}_4\text{H}_5\text{O}_3\text{N}$ MW, 115

Leaflets from H_2O . M.p. 172–3° (decomp. at 152–3°). Sol. H_2O , hot EtOH. Insol. Et_2O , C_6H_6 , CHCl_3 . Alc. KOH \rightarrow fumaric acid.

Anilide: maleanilic acid amide. Yellow cryst. from C_6H_6 . M.p. 173–5°.

N-Benzyl: leaflets from EtOH.Aq. M.p. 138°. Sol. EtOH, Et_2O . Spar. sol. H_2O . Insol. C_6H_6 .

N-Diphenyl: see under Maleanilic Acid.

Piutti, Giustiniani, *Gazz. chim. ital.*, 1896, **26**, 438.

Anschütz, *Ann.*, 1890, **259**, 138.

Plancher, Ravenna, *Atti accad. Lincei*, 1905, **14**, 216.

Maleamide (*Maleic acid diamide, maleinamide*)

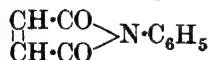


$\text{C}_4\text{H}_6\text{O}_2\text{N}_2$ MW, 114

Cryst. from MeOH. M.p. 266° decomp.

Rinkes, *Rec. trav. chim.*, 1927, **46**, 272.

Maleanil (*Maleinanil, N-phenylmaleimide*)



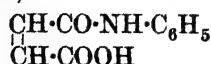
$\text{C}_{10}\text{H}_7\text{O}_2\text{N}$ MW, 173

Yellow needles from C_6H_6 -ligroin. M.p. 90–1°. B.p. 162.1–162.3°/12 mm. Sol. EtOH, Et_2O , C_6H_6 , CHCl_3 . Spar. sol. H_2O , ligroin, CS_2 . Alkalis \rightarrow fumaranilic acid.

Anschütz, Wirtz, *Ann.*, 1887, **239**, 140.

Auwers, Schleicher, *Ann.*, 1899, **309**, 346.

Maleanilic Acid (*Maleic acid monoanilide, maleinanilic acid*)



$\text{C}_{10}\text{H}_9\text{O}_3\text{N}$ MW, 191

Yellow prisms from EtOH. M.p. 198° (187–187.5°). Spar. sol. H_2O .

Me ester: $\text{C}_{11}\text{H}_{11}\text{O}_3\text{N}$. MW, 205. Leaflets or needles from C_6H_6 . M.p. 76–78.5°. Sol.

EtOH, Et_2O . Mod. sol. C_6H_6 . Spar. sol. pet. ether.

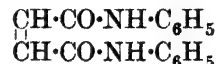
Amide: see under Maleamic Acid.

N-Phenyl: *N*-diphenylmaleamic acid. Needles from EtOH. M.p. 130°.

Anschütz, *Ber.*, 1887, **20**, 3215.

Hoogewerff, v. Dorp, *Rec. trav. chim.*, 1899, **18**, 363.

Maleanilide (*Maleic acid dianilide, maleinanilide*)



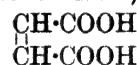
$\text{C}_{16}\text{H}_{14}\text{O}_2\text{N}_2$ MW, 266

Leaflets or prisms from MeOH or EtOH. M.p. 184–6°. Sol. MeOH, EtOH. Spar. sol. dry Et_2O , C_6H_6 .

v. Dorp, v. Haarst, *Rec. trav. chim.*, 1900, **19**, 311.

v. Dorp, v. Dorp, *Rec. trav. chim.*, 1906, **25**, 103.

Maleic Acid (*Ethylene-1 : 2-dicarboxylic acid, cis-form.* Cf. Fumaric Acid)



$\text{C}_4\text{H}_4\text{O}_4$ MW, 116

Prisms. M.p. 130–130.5°. Very sol. H_2O , EtOH. k (first) = 1.17×10^{-2} at 25°; (second) = 2.6×10^{-7} at 25°. On standing \rightarrow fumaric acid. Heat at 160° \rightarrow anhydride. Electrolysis in alk. sol. \rightarrow succinic acid + acetylene. Ozone in H_2O \rightarrow glyoxylic acid. KMnO_4 \rightarrow mesotartaric acid.

Di-Me ester: $\text{C}_6\text{H}_8\text{O}_4$. MW, 144. B.p. 205°, 102°/17 mm. D_4^{14} 1.1529, D_4^{21} 1.15060. $n_D^{19.9}$ 1.441556. Heat with I \rightarrow fumaric ester.

Mono-Et ester: $\text{C}_6\text{H}_8\text{O}_4$. MW, 144. Syrup. Very sol. H_2O . $k = 1.1 \times 10^{-3}$ at 25°.

Di-Et ester: $\text{C}_8\text{H}_{12}\text{O}_4$. MW, 172. B.p. 223°, 105–6°/14 mm. $D_4^{17.8}$ 1.07155, D_{16}^{16} 1.0735. $n_D^{19.9}$ 1.441556.

Dipropyl ester: $\text{C}_{10}\text{H}_{16}\text{O}_4$. MW, 200. $D_4^{18.4}$ 1.03049. $n_D^{18.3}$ 1.444453.

Di-isopropyl ester: $\text{C}_{10}\text{H}_{16}\text{O}_4$. MW, 200. B.p. 232–5° slight decomp.

Di-active-amyl ester: $\text{C}_{14}\text{H}_{24}\text{O}_4$. MW, 256. B.p. 170°/29 mm., 160°/20 mm. D_4^{20} 0.9708. n_D 1.4472. $[\alpha]_D^{20} + 4.62^\circ$.

Mono-l-menthyl ester: cryst. from pet. ether. M.p. 85°.

Di-l-menthyl ester: cryst. from EtOH. M.p. 98–3°.

Mono-l-bornyl ester: plates from pentane. M.p. 50°. $[\alpha]_D^{17} - 47.5^\circ$ in EtOH, $[\alpha]_D^{16} - 56.9^\circ$ in CHCl_3 .

Di-l-bornyl ester: cryst. from EtOH.Aq. M.p. 81°. $[\alpha]_D^{25} - 55^\circ$ in EtOH.

Monophenyl ester: $C_{10}H_8O_4$. MW, 192. Needles from C_6H_6 -ligroin. M.p. 101°.

Diphenyl ester: $C_{16}H_{12}O_4$. MW, 268. Plates from ligroin. M.p. 73°. B.p. 226°/15 mm.

Mono-o-toluidide: $C_{11}H_{11}O_3N$. MW, 205. Yellow prisms from EtOH. M.p. 117.5–118°. Sol. EtOH, Me_2CO . Insol. H_2O , Et_2O , C_6H_6 , ligroin, CS_2 .

Mono-p-toluidide: yellow needles from EtOH. M.p. 201° decomp. Sol. hot EtOH, Me_2CO , Et_2O . Insol. H_2O , C_6H_6 , $CHCl_3$, ligroin.

Di-p-toluidide: $C_{18}H_{18}O_2N_2$. MW, 294. Cryst. from Et_2O . M.p. 142°.

2-Mononaphthalide: yellow needles from $CHCl_3$. M.p. 200° decomp. Sol. EtOH. Insol. H_2O .

Hydrazine deriv.: needles. M.p. 144° decomp.

Anhydride: see Maleic Anhydride.

Monoamide: see Maleamic Acid.

Diamide: see Maleamide.

Monoanilide: see Maleanilic Acid.

Dianilide: see Maleanilide.

Imide: see Maleimide.

Ureide: see Maleuric Acid.

Knops, *Ann.*, 1888, **248**, 194.

Dunlap, Phelps, *Am. Chem. J.*, 1897, **19**, 494.

Kempf, *Ber.*, 1906, **39**, 3722.

Rather, Reid, *J. Am. Chem. Soc.*, 1919, **41**, 80.

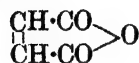
Guistiniani, *Gazz. chim. ital.*, 1893, **23**, 182.

Wassermann, *Ann.*, 1931, **488**, 223; 1932, **492**, 266.

Bischoff, v. Hedenström, *Ber.*, 1902, **35**, 4087.

I.G., F.P., 721,763, (*Chem. Abstracts*, 1932, **26**, 4067).

Maleic Anhydride



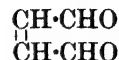
$C_4H_2O_3$ MW, 98

Needles from $CHCl_3$ or Et_2O . M.p. 60° (53°). B.p. 196°, 82°/14 mm. Sol. Me_2CO , $CHCl_3$. Spar. sol. ligroin. Readily sublimes. Forms characteristic add. comps. with compounds containing conjugated double bonds.

I.G., F.P., 721,763, (*Chem. Abstracts*, 1932, **26**, 4067).

Terry, Eichelberger, *J. Am. Chem. Soc.*, 1925, **47**, 1076.

Maleic Dialdehyde (*Malealdehyde*, *dialdehydeethylene*)



$C_4H_4O_2$ MW, 84

Yellow oil. B.p. 56–9°/9.5 mm. Sol. Me_2CO , $AcOH$, $CHCl_3$. Spar. sol. Et_2O , C_6H_6 , toluene, CCl_4 , CS_2 . Yellow sols. in H_2O , $MeOH$, $EtOH$, and amyl alcohol become colourless on standing. Py sol. turns brown. Slowly polymerises. Reacts acid to litmus. $Ag_2CO_3 + H_2O \longrightarrow$ fumaric + maleic acids.

Dioxime: cryst. from $MeOH$. Decomp. at 152–5°. Sol. H_2O , amyl alcohol. Spar. sol. Et_2O , C_6H_6 , $CHCl_3$, pet. ether.

Disemicarbazone: needles from H_2O . Spar. sol. all other solvents. Decomp. at 246–7°.

Diphenylhydrazone: plates from $EtOH$. M.p. 198–9° decomp. Sol. $EtOH$, hot $MeOH$, Me_2CO , $AcOH$, $AcOEt$, Py . Mod. sol. $CHCl_3$, C_6H_6 . Spar. sol. H_2O , Et_2O , pet. ether.

Di-p-nitrophenylhydrazone: purple cryst. M.p. 238–40°. Sol. hot $EtOH$, $MeOH$, $AcOH$, Py . Insol. Et_2O , Me_2CO , C_6H_6 . Conc. $H_2SO_4 \longrightarrow$ intense ruby-red sol.

Tetra-Me acetal: b.p. 198–198.5°/760 mm., 78°/10 mm. D_4^{20} 1.0047. n_D^{20} 1.42817. Mod. sol. H_2O . Misc. with most org. solvents.

Tetra-Et acetal: b.p. 112–112.5°/11 mm. D^{23} 0.926.

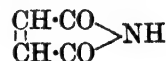
Wohl, Mylo, *Ber.*, 1912, **45**, 1746.

Wohl, Bernreuther, *Ann.*, 1930, **482**, 11, 29.

Maleic Semi-aldehyde.

See Formylacrylic Acid.

Maleimide (*Maleinimide*)



$C_4H_3O_2N$ MW, 97

Plates. M.p. 93°. Readily sublimes.

N-Me: $C_5H_5O_2N$. MW, 111. Prisms from Et_2O . M.p. 90–2°. Sol. $EtOH$. Spar. sol. C_6H_6 . Easily volatile.

N-Et: $C_6H_7O_2N$. MW, 125. Cryst. from C_6H_6 . M.p. 45–5°. Very sol. $EtOH$, Et_2O . Spar. sol. H_2O .

N-Phenyl: see Maleanil.

Piutti, Guistiniani, *Gazz. chim. ital.*, 1896, **26**, 438.

Plancher, Cottaderi, *Atti accad. Lincei*, 1904, **13**, 489.

Maleinamic Acid.

See Maleamic Acid.

Maleinamide.

See Maleamide.

Maleinanil.

See Maleanil.

Maleinanilic Acid.

See Maleanilic Acid.

Maleinanilide.

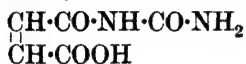
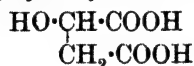
See Maleanilide.

Maleinimide.

See Maleimide.

Maleinuric Acid.

See Maleuric Acid.

Maleuric Acid (Maleinuric acid)C₅H₆O₄N₂ MW, 158Cryst. M.p. 167.5–168° decomp. Sol. hot H₂O, Et₂O. Insol. Et₂O, CHCl₃.Dunlap, Phelps, *Am. Chem. J.*, 1897, **19**, 492.**Malic Acid (Hydroxysuccinic acid)**C₄H₆O₅ MW, 134

d.

Cryst. M.p. 98–9°. Sol. H₂O, EtOH, MeOH, Me₂CO. [α]_D + 2.92° in MeOH, + 5.2° in Me₂CO.*Di-Na salt*: [α]_D²⁰ + 8.29° in H₂O.*Di-Me ester*: C₆H₁₀O₅. MW, 162. [α]_D + 6°.*Cinnamyl ester*: m.p. 105–10°.*Quinine salt*: cryst. M.p. 160–70°. Spar. sol. cold H₂O.*Me ether*: see Methoxysuccinic Acid.*Et ether*: d-ethoxysuccinic acid. C₆H₁₀O₅. MW, 162. Prisms. M.p. 76–80°. [α]_D¹⁷ + 34.73° in H₂O, [α]_D¹⁵ + 60.57° in EtOH, [α]_D¹³ + 47.75° in CHCl₃, [α]_D¹⁹ + 70.52° in AcOEt. Hygroscopic.*Mono-NH₄ salt*: leaflets or prisms. [α]_D¹⁷ + 29.48°. *Di-NH₄ salt*: [α]_D¹³ + 18.93° in H₂O.*Mono-K salt*: prisms. [α]_D¹⁹ + 26.49° in H₂O. *Di-Me ester*: C₆H₁₄O₅. MW, 190. B.p. 121°/30 mm. D₄¹³ 1.1055. [α]_D¹³ + 59.86°.*Di-Et ester*: C₁₀H₁₈O₅. MW, 218. B.p. 124°/13 mm. D₄¹³ 1.0475. [α]_D¹⁵ + 55.62°. *Dipropyl ester*: C₁₂H₂₂O₅. MW, 246. B.p. 144°/11 mm. D₄¹⁵ 1.0131. [α]_D¹⁵ + 51.31°.*Propyl ether*: C₇H₁₂O₅. MW, 176. Cryst. M.p. 63–6°. [α]_D¹³ + 36.04° in H₂O. Hygroscopic. *Mono-K salt*: [α]_D¹⁵ + 32.30° in H₂O.*Di-K salt*: [α]_D¹⁵ + 18.69° in H₂O. *Ca salt*: [α]_D¹³ + 14.18° in H₂O.*Mono-amide*: see Malamic Acid.*Diamide*: see Malamide.*Benzylamide*: see under Malamic Acid.

l.

Needles. M.p. 100°. Very sol. EtOH. Spar. sol. Et₂O. D₄²⁰ 1.595. Specific rotation depends on the concentration of the sol. *k* (first) = 3.95 × 10⁻⁴ at 25°; (second) = 8.3 × 10⁻⁶ at 25°. Heat at 100° → malomalic acid. Electrolysis → acetaldehyde. HI at 130° → succinic acid. 20% NaOH → fumaric acid. Ag₂O → malonic acid.*Mono-NH₄ salt*: m.p. 160–1°. D₁₃²⁰ 1.5500. Triboluminescent.*Di-Me ester*: b.p. 242°, 122°/12 mm. D₄²⁰ 1.2334, D₁₀₀ 1.1442. *n*_D²⁰ 1.4425. [α]_D²⁰ – 6.85°. On long heating → fumaric ester. Easily decomp. by H₂O. *Acetyl*: see under Acetoxy-succinic Acid. *Chloroacetyl*: b.p. 187–8°/37 mm. D₄²⁰ 1.3062. *n*_D²⁰ 1.4530. [α]_D²⁰ – 23.30°. *Bromoacetyl*: b.p. 194–5°/22 mm. D₄²⁰ 1.5072. *n*_D²⁰ 1.4680. [α]_D²⁰ – 22.40°. *Propionyl*: b.p. 145–7°/10 mm. D₄²⁰ 1.1609. *n*_D²⁰ 1.4328. [α]_D²⁰ – 22.94°. *Butyryl*: b.p. 150°/10 mm. D₄²⁰ 1.1317. *n*_D²⁰ 1.4342. [α]_D²⁰ – 22.44°. *Isobutyryl*: b.p. 140°/8 mm. D₄²⁶ 1.1255. *n*_D²⁰ 1.4310. [α]_D²⁰ – 22.36°. *Isovaleryl*: b.p. 158–60°/10 mm. D₄²⁰ 1.1034. *n*_D²⁰ 1.4350. [α]_D²⁰ – 22.39°. *Benzoyl*: b.p. 210–23°/12 mm. D₄⁴⁰ 1.1944. [α]_D²¹ – 5.62°. *Cinnamoyl*: m.p. 304–5°.*Di-Et ester*: C₈H₁₄O₅. MW, 190. B.p. 253°, 128°/10 mm. D₄²⁰ 1.1280, D₁₀₀ 1.10366, D₄⁴⁰ 1.1099. *n*_D²⁰ 1.4362. [α]_D²⁰ – 10.18°, [α]_D¹¹ – 10.30°. *Formyl*: b.p. 120–1°/2 mm. *Acetyl*: see under Acetoxy-succinic Acid. *Bromoacetyl*: b.p. 178–82°/10 mm. D₄²⁰ 1.3936. *n*_D²⁰ 1.4610. [α]_D²⁰ – 22.48°. *Propionyl*: b.p. 150°/9 mm., 160°/18 mm. D₄²⁰ 1.0958, *n*_D²⁰ 1.4308. [α]_D²⁰ – 22.20°. *1-Bromopropionyl*: b.p. 187–8°/12 mm. D₄²⁰ 1.3325. *n*_D²⁰ 1.4561. [α]_D²⁰ – 22.48°. *Butyryl*: b.p. 162–3°/12 mm., 157°/13 mm. D₄¹¹ 1.0792, D₄²⁰ 1.0736. *n*_D²⁰ 1.4315. [α]_D²⁰ – 22.22°, [α]_D¹¹ – 22.70°. *1-Bromobutyryl*: b.p. 188–90°/10 mm. D₄²⁰ 1.3059. *n*_D²⁰ 1.4568. [α]_D²⁰ – 24.76°. *Isobutyryl*: b.p. 160°/15 mm. D₄²⁰ 1.0688. *n*_D²⁰ 1.4285. [α]_D²⁰ – 21.90°. *1-Bromoisobutyryl*: b.p. 177–80°/12 mm. D₄²⁰ 1.2850. *n*_D²⁰ 1.4520. [α]_D²⁰ – 22.57°. *n-Valeryl*: b.p. 176–7°/19 mm. D₄²⁰ 1.0551. *n*_D²⁰ 1.43168. [α]_D²⁰ – 21.38°. *Iso-valeryl*: b.p. 168°/10 mm. D₄²⁰ 1.0605. *n*_D²⁰ 1.4538. [α]_D²⁰ – 22.07°. *Caproyl*: b.p. 182–182.6°/17 mm. D₄²⁰ 1.0420. *n*_D²⁰ 1.43348. [α]_D²⁰ – 20.30°. *Heptylyl*: b.p. 191.6–192.2°/15.5 mm. D₄²⁰ 1.0289. *n*_D²⁰ 1.43499. [α]_D²⁰ – 19.30°. *Caprylyl*: b.p. 199.4°/15 mm. D₄²⁰

1-0162. n_D^{20} 1.43639. $[\alpha]_D^{20}$ -18.21°. *Pelargonyl*: b.p. 206.8-208.8°/14.5 mm. D_4^{20} 1.0073. n_D^{20} 1.43820. $[\alpha]_D^{20}$ -17.24°. *Capryl*: b.p. 217.2-217.6°/13.5 mm. D_4^{20} 1.0011. n_D^{20} 1.43931. $[\alpha]_D^{20}$ -16.61°. *Benzoyl*: b.p. 210-20°/12 mm. D_4^{40} 1.1361. $[\alpha]_D^{21}$ -3.87°. *Cinnamoyl*: light yellow oil. B.p. 195°/2 mm. *Hydrocinnamoyl*: b.p. 185-6°/3 mm. *Ethane-sulphonyl*: b.p. 154-5°/0.5 mm. *p-Toluenesulphonyl*: b.p. 197-8°/1 mm.

Dipropyl ester: $C_{10}H_{18}O_5$. MW, 218. B.p. 152°/10 mm. D_4^{20} 1.0736. n_D^{20} 1.4380. $[\alpha]_D^{20}$ -11.601°. *Acetyl*: b.p. 162-3°/16 mm. D_4^{20} 1.0724. n_D^{20} 1.4315. $[\alpha]_D^{20}$ -22.85°. *Chloroacetyl*: b.p. 182-4°/15 mm. D_4^{20} 1.1566. n_D^{20} 1.4465. $[\alpha]_D^{20}$ -23.52°. *Bromoacetyl*: b.p. 192-3°/17 mm. D_4^{20} 1.3150. n_D^{20} 1.4608. $[\alpha]_D^{20}$ -22.24°. *Butyryl*: b.p. 174.5°/16 mm. D_4^{20} 1.0417. n_D^{20} 1.4348. $[\alpha]_D^{20}$ -22.40°. *Isovaleryl*: b.p. 182-3°/17 mm. D_4^{20} 1.0263. n_D^{20} 1.4352. $[\alpha]_D^{20}$ -21.68°. *Di-isopropyl ester*: $C_{10}H_{18}O_5$. MW, 218. B.p. 147°/14 mm. D_4^{20} 1.1076. n_D^{20} 1.4363. $[\alpha]_D^{20}$ -10.41°.

Dibutyl ester: $C_{12}H_{22}O_5$. MW, 246. B.p. 169.4-170.4°/12-13 mm. D_4^{20} 1.0382. $[\alpha]_D^{20}$ -10.72°. *Acetyl*: b.p. 177.4-178.2°/12 mm. D_4^{20} 1.0430. $[\alpha]_D^{20}$ -19.925°.

Di-isobutyl ester: $C_{12}H_{22}O_5$. MW, 246. B.p. 175°/15 mm. D_4^{20} 1.0418. n_D^{20} 1.4392. $[\alpha]_D^{20}$ -11.14°. *Acetyl*: b.p. 179°/20 mm. D_4^{20} 1.0362. n_D^{20} 1.4330. $[\alpha]_D^{20}$ -21.88°. *Bromoacetyl*: b.p. 195-7°/15 mm. D_4^{20} 1.2022. n_D^{20} 1.4520. $[\alpha]_D^{20}$ -20.38°. *Butyryl*: b.p. 190-2°/14 mm. D_4^{20} 1.0146. n_D^{20} 1.4352. $[\alpha]_D^{20}$ -21.68°. *Isovaleryl*: b.p. 195°/16 mm. D_4^{20} 1.0045. n_D^{20} 1.4353. $[\alpha]_D^{20}$ -19.91°.

Di-d-amyl ester: $C_{14}H_{26}O_5$. MW, 274. B.p. 191-2°/20 mm. D_4^{20} 1.0176. $[\alpha]_D^{20}$ -6.88°.

Di-dl-amyl ester: b.p. 191-2°/20 mm. D_4^{20} 1.0179. n_D^{20} 1.4438. $[\alpha]_D^{20}$ -9.92°.

Me ether: see Methoxysuccinic Acid.

Et ether: l-ethoxysuccinic acid. $C_6H_{10}O_5$. MW, 162. Cryst. M.p. 76-80°. $[\alpha]_D^{14}$ -66.48° in Me_2CO . *Mono-NH₄ salt*: leaflets or prisms. $[\alpha]_D$ -29.49° in H_2O . *Mono-strychnine salt*: $[\alpha]_D^{11}$ -34.9° in H_2O . *Di-strychnine salt*: $[\alpha]_D^{17}$ -34° in H_2O . *Di-Me ester*: $C_8H_{14}O_5$. MW, 190. B.p. 110°/12 mm. D_4^{13} 1.1080. $[\alpha]_D^{13}$ -61.13°. *Di-Et ester*: $C_{10}H_{18}O_5$. MW, 218. B.p. 118-20°/15 mm. D_4^{13} 1.0501. $[\alpha]_D^{13}$ -54.14°. *Dipropyl ester*: $C_{12}H_{22}O_5$. MW, 246. B.p. 147°/17 mm. D_4^{13} 1.0226. $[\alpha]_D^{13}$ -51.20°. *Dibutyl ester*: $C_{14}H_{26}O_5$. MW, 274. B.p. 158°/13 mm. D_4^{13} 1.0045. $[\alpha]_D^{13}$ -46.43°.

Propyl ether: $C_7H_{12}O_5$. MW, 176. Cryst.

M.p. 67°. $[\alpha]_D^{13}$ -36.40° in H_2O , $[\alpha]_D^{13}$ -64.39° in Me_2CO . Very hygroscopic. *Ca salt*: $[\alpha]_D^{13}$ -14.49° in H_2O . *Ba salt*: cryst. $[\alpha]_D^{13}$ -10.45° in H_2O .

Isopropyl ether: $C_7H_{12}O_5$. MW, 176. Cryst. $[\alpha]_D^{13}$ -36.26° in H_2O . Decomp. easily. *Mono-K salt*: $[\alpha]_D^{13}$ -31.78° in H_2O . *Di-K salt*: $[\alpha]_D^{13}$ -19.02° in H_2O . *Ca salt*: cryst. Spar. sol. H_2O . $[\alpha]_D^{13}$ -19.57° in H_2O . *Ba salt*: cryst. Sol. H_2O . $[\alpha]_D^{13}$ -12.16° in H_2O . *Di-isopropyl ester*: $C_{12}H_{22}O_5$. MW, 260. B.p. 148°/25 mm. D_4^{17} 0.9762. $[\alpha]_D^{13}$ -58.47°.

Isobutyl ether: $C_8H_{14}O_5$. MW, 190. *Di-Na salt*: $[\alpha]_D$ -27.8° in H_2O . *Ba salt*: $[\alpha]_D^{13}$ -21.4° in H_2O .

Acetyl: see Acetoxysuccinic Acid.

Propionyl: cryst. from $CHCl_3$. Decomp. at 130°.

Nitrate: "nitromalic acid." Needles from H_2O . M.p. 115° decomp. Sol. H_2O , EtOH, Et₂O, AcOH. Insol. C_6H_6 , ligroin. *Di-Me ester*: cryst. M.p. 24-5°. D_4^{20} 1.3184. n_D^{13} 1.4390. $[\alpha]_D^{20}$ -18.80° in $CHCl_3$. *Di-Et ester*: F.p. -70°. B.p. 148-51°/25 mm. D_4^{16} 1.2024. D_4^{20} 1.2090. n_D^{13} 1.4325. $[\alpha]_D^{20}$ -31.24°. *Dipropyl ester*: liq. Decomp. on heating. D_4^{20} 1.1932. n_D^{13} 1.4363. $[\alpha]_D^{20}$ -10.41°.

Benzoyl: cryst. from H_2O . M.p. 162°.

Cinnamoyl: m.p. 145°. *Ag salt*: $[\alpha]_D^{25}$ +8.6°.

Monoamide: see Malamic Acid.

Diamide: see Malamide.

Monoanilide: malanilic acid. $C_{10}H_{11}O_4N$. MW, 209. Cryst. M.p. 155°. Sol. H_2O , EtOH. Spar. sol. Et₂O.

Dianilide: see Malanilide.

Benzylamide: see under Malamic Acid.

Dihydrazide: amorph. from EtOH.Aq. M.p. 177.5°. Sol. H_2O . Mod. sol. EtOH. Spar. sol. Et₂O. *B,2HCl*: needles. M.p. 189° decomp. Very sol. H_2O . *Diacetyl*: m.p. 174.5°. *Di-benzylidene*: m.p. 164°. *Cinnamylidene*: m.p. 192°. *Acetone deriv.*: m.p. 168°.

Anhydride: $C_4H_4O_4$. MW, 116. *Acetyl*: m.p. 58°. Very sol. AcOH, Ac₂O.

Mono-o-toluidide: leaflets from Et₂O. M.p. 174°. Sol. H_2O , EtOH, Et₂O.

Di-o-toluidide: $C_{18}H_{20}O_3N_2$. MW, 312. Plates from EtOH. M.p. 180.5-181.5°. Sol. EtOH, AcOH, Me_2CO . Spar. sol. Et₂O, $CHCl_3$, ligroin. $[\alpha]_D$ -61.8° in Py.Aq., -65.0° in AcOH.

Di-m-toluidide: cryst. M.p. 153°. $[\alpha]_D^{17}$ -75.9° in Py.Aq.

Mono-p-toluidide: $C_{11}H_{13}O_4N$. MW, 223. Needles from EtOH. M.p. 178°.

Di-p-toluidide: needles from EtOH. M.p. 207°

(195°). Sol. hot AcOH. Mod. sol. EtOH, CHCl₃, ligroin. Almost insol. H₂O, Et₂O. $[\alpha]_D^{25} - 92.5^\circ$ in Py.Aq., $- 70^\circ$ in AcOH.Aq.

dl.

Cryst. M.p. 133° (125–6°). Very sol. H₂O. D_4^{20} 1.601 in vacuo. k (first) = 3.99×10^{-4} at 25°; (second) = 5.5×10^{-6} at 25°.

Cinchonine salt: m.p. 135–40°. $[\alpha]_D + 141.5^\circ$ in H₂O.

Di-Et ester: C₈H₁₄O₅. MW, 190. B.p. 255°, 150–2°/27 mm. D_4^{21} 1.124.

Di-d-amyl ester: C₁₄H₂₆O₅. MW, 274. B.p. 191–2°/20 mm. D_4^{20} 1.0180. $[\alpha]_D^{20} + 3.50^\circ$.

Me ether: see Methoxysuccinic Acid.

Et ether: *dl*-ethoxysuccinic acid. C₆H₁₀O₅. MW, 162. Cryst. from Et₂O. M.p. 86°. Very sol. H₂O, EtOH, Et₂O. *Di-Et ester*: C₁₀H₁₈O₅. MW, 218. B.p. 126°/14–15 mm., 195–200°/250 mm.

Propyl ether: C₉H₁₂O₅. MW, 176. Cryst. M.p. 73–5°.

Isobutyl ether: C₁₀H₁₄O₅. MW, 190. Cryst. Easily decomp.

Mono-p-nitrobenzyl ester: m.p. 87.2°.

Di-p-nitrobenzyl ester: m.p. 124.5°.

Phenacyl ester: cryst. from EtOH. M.p. 106°.

Dichloride: C₄H₄O₃Cl₂. MW, 171. *Acetyl*: b.p. 118°/14 mm. D_4^{22} 1.377. $[\alpha]_D^{22} - 13.1^\circ$.

Bischoff, Nastvogel, *Ber.*, 1890, 23, 2043.
Purdie, Williamson, *J. Chem. Soc.*, 1895, 67, 959.

Walden, *Z. physik. Chem.*, 1895, 17, 248; *Ber.*, 1896, 29, 136.

Tingle, Bates, *J. Am. Chem. Soc.*, 1909, 31, 1239.

Purdie, Young, *J. Chem. Soc.*, 1910, 97, 1531.

Curtius, *J. prakt. Chem.*, 1917, 95, 210.

Rather, Reid, *J. Am. Chem. Soc.*, 1919, 41, 79.

Freudenberg, Brauns, *Ber.*, 1922, 55, 1349.

Freudenberg, Noë, *Ber.*, 1925, 58, 2403.

Takahashi, Yoshida, *Chem. Abstracts*, 1932, 26, 5070.

Jones, *J. Chem. Soc.*, 1933, 795

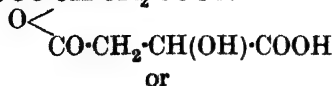
Malol.

See Ursolic Acid.

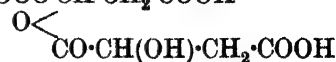
Malolic Acid.

See Ursolic Acid.

Malomalic Acid



or



C₈H₁₀O₉ MW, 250

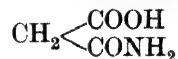
Solid. $[\alpha]_D - 16.2^\circ$ in H₂O, $- 21.4^\circ$ in Me₂CO. Stable in cold H₂O. Hot H₂O \longrightarrow *l*-malic acid.

Walden, *Ber.*, 1899, 32, 2707.

Malonaldehydic Acid.

See Formylacetic Acid.

Malonamic Acid (*Malonic acid monoamide, malonamidic acid, carbamylacetic acid*)



C₃H₅O₃N MW, 103

Et ester: C₆H₉O₃N. MW, 131. Needles from Me₂CO. M.p. 50°.

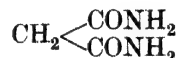
Hydrazide: needles from EtOH. M.p. 126–7°. Sol. H₂O. Spar. sol. EtOH, AcOH. Insol. Et₂O, C₆H₆, CHCl₃, ligroin.

Nitrile: see under Cyanoacetic Acid.

Pinner, *Ber.*, 1895, 28, 479.

Bulow, Bozenhardt, *Ber.*, 1910, 43, 561.

Malonamide (Malonic acid diamide)



C₃H₆O₂N₂ MW, 110

Dimorphous. M.p. 170°. Insol. EtOH, Et₂O.

N-Me: C₄H₈O₂N₂. MW, 116. *N'-Phenyl*: methylamide-anilide. M.p. 154°. *N'-p-Tolyl*: methylamide-*p*-toluidide. M.p. 176°.

N-Et: C₅H₁₀O₂N₂. MW, 130. Plates from EtOH–C₆H₆. M.p. 123°. *N'-Phenyl*: ethylamide-anilide. M.p. 151°. *N'-p-Tolyl*: ethylamide-*p*-toluidide. Plates from H₂O. M.p. 176°.

N-Isopropyl: C₆H₁₂O₂N₂. MW, 144. Prisms from EtOH–C₆H₆. M.p. 129°. *N'-p-Tolyl*: propylamide-*p*-toluidide. Needles from EtOH. M.p. 192°.

N-Isobutyl: C₇H₁₄O₂N₂. MW, 158. Needles from C₆H₆. M.p. 83°. *N'-p-Tolyl*: isobutylamide-*p*-toluidide. Needles from EtOH. M.p. 177°.

N-Phenyl: amide-anilide. C₉H₁₀O₂N₂. MW, 178. Needles from EtOH or H₂O. M.p. 163°.

N-Tolyl: see under Malonic Acid.

N-N'-Di-Et: C₇H₁₄O₂N₂. MW, 158. Plates from EtOH–pet. ether. M.p. 149°. Sol. MeOH, EtOH, Me₂CO, CHCl₃, AcOH, AcOEt. Mod. sol. C₆H₆. Spar. sol. pet. ether, CCl₄. Insol. Et₂O.

N-N'-Dipropyl: C₉H₁₈O₂N₂. MW, 186. Plates from Me₂CO. M.p. 139°. Sol. EtOH,

MeOH, CHCl_3 , AcOH, AcOEt, CCl_4 . Less sol. Me_2CO , H_2O , C_6H_6 . Spar. sol. pet. ether.

N : N'-*Di-isopropyl* : needles from pet. ether. M.p. 114°.

N : N'-*Dibutyl* : $\text{C}_{11}\text{H}_{22}\text{O}_2\text{N}_2$. MW, 214. Plates. M.p. 132.5°. Sol. EtOH, MeOH, AcOH, AcOEt, Me_2CO , CHCl_3 , C_6H_6 , CCl_4 . Spar. sol. H_2O , pet. ether.

N : N'-*Di-isobutyl* : needles from AcOEt. M.p. 126.5°. Sol. EtOH, MeOH, CHCl_3 , AcOH. Less sol. Et_2O , Me_2CO , C_6H_6 , AcOEt. Insol. H_2O , pet. ether.

N : N'-*Diphenyl* : see Malonanilide.

N-*Benzyl* : $\text{C}_{10}\text{H}_{12}\text{O}_2\text{N}_2$. MW, 192. N'-*p-Tolyl* : needles from EtOH. M.p. 188°.

N : N'-*Dibenzyl* : $\text{C}_{21}\text{H}_{18}\text{O}_2\text{N}_2$. MW, 330. Plates. M.p. 142°. Sol. EtOH, MeOH, CHCl_3 , AcOH. Spar. sol. H_2O , Me_2CO , C_6H_6 , AcOEt. Insol. Et_2O .

N : N'-*Ditolyl* : see under Malonic Acid.

West, *J. Chem. Soc.*, 1925, 127, 750.

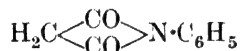
Backes, West, Whiteley, *J. Chem. Soc.*, 1921, 119, 364.

Fischer, Diltthey, *Ber.*, 1902, 35, 846.

Malonamidic Acid.

See Malonamic Acid.

Malonanil (N-Phenylmalonimide)



$\text{C}_9\text{H}_7\text{O}_2\text{N}$ MW, 161

Cryst. from toluene. M.p. 249°. Stable to conc. HCl and HNO_3 . Hot conc. $\text{H}_2\text{SO}_4 \rightarrow$ aniline + $\text{CH}_3\cdot\text{COOH} + \text{CO}_2$.

Warren, Briggs, *Ber.*, 1931, 64, 28.

Malonanilic Acid (Malonic acid mono-anilide)



$\text{C}_9\text{H}_9\text{O}_3\text{N}$ MW, 179

Cryst. from H_2O , EtOH, or Et_2O . M.p. 132°. Decomp. above m.p. \rightarrow acetanilide + CO_2 . $k = 1.96 \times 10^{-5}$ at 25°.

Me ester : $\text{C}_{10}\text{H}_{11}\text{O}_3\text{N}$. MW, 193. Needles from Et_2O -pet. ether. M.p. 42-3°.

Ester : $\text{C}_{11}\text{H}_{13}\text{O}_3\text{N}$. MW, 207. Cryst. from Et_2O or C_6H_6 . M.p. 38-9°. Sol. EtOH, C_6H_6 , CHCl_3 . Insol. H_2O , ligroin.

Amide : see under Malonamide.

N-*Benzoyl* : prisms from C_6H_6 . M.p. 100-1° decomp.

Chattaway, Olmsted, *J. Chem. Soc.*, 1910, 97, 939.

Rügeheimer, *Ber.*, 1884, 17, 736.

Dict. of Org. Comp.—II.

Malonanilide (Malonic acid dianilide)



$\text{C}_{15}\text{H}_{14}\text{O}_2\text{N}_2$ MW, 254

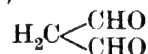
Needles from EtOH. M.p. 225°. Sol. hot EtOH, AcOH. Insol. H_2O , Et_2O .

N : N'-*Di-Me* : $\text{C}_{17}\text{H}_{18}\text{O}_2\text{N}_2$. MW, 282. Prisms. M.p. 108-9°. Sol. EtOH. Mod. sol. H_2O .

N : N'-*Diphenyl* : prisms. M.p. 219-20° decomp.

Chattaway, Olmsted, *J. Chem. Soc.*, 1910, 97, 939.

Malondialdehyde (Malonic dialdehyde, dialdehydomethane)



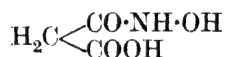
$\text{C}_3\text{H}_4\text{O}_2$ MW, 72

Only known in aq. sol. Reacts strongly acid. $\text{FeCl}_3 \rightarrow$ intense red col.

Dianil : yellow leaflets. M.p. 115°. *B, HCl* : yellowish-brown needles.

Claisen, *Ber.*, 1903, 36, 3668.

Malonhydroxamic Acid



$\text{C}_3\text{H}_5\text{O}_4\text{N}$ MW, 119

NH₄ salt : m.p. 181°.

Amide : $\text{C}_3\text{H}_6\text{O}_3\text{N}_2$. MW, 118. *Oxime* : prisms from H_2O . Decomp. about 152°. Spar. sol. H_2O . Insol. EtOH, Et_2O , C_6H_6 , AcOH, ligroin. $k = 6.6 \times 10^{-8}$ at 25°.

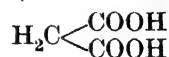
Oxime : prisms from H_2O , plates from AcOH.Aq. M.p. 154-5° (160°). Spar. sol. EtOH. Insol. Et_2O .

Hantzsch, Schatzmann, Urbahn, *Ber.*, 1894, 27, 804.

Modeen, *Ber.*, 1891, 24, 3438.

See also de Paolini, Carbone, *Gazz. chim. ital.*, 1930, 60, 261.

Malonic Acid (Methane-dicarboxylic acid)



$\text{C}_3\text{H}_4\text{O}_4$ MW, 104

Cryst. M.p. 135.6°. Sol. H_2O , EtOH, Et_2O . Mod. sol. Py. k (first) = 1.71×10^{-3} at 25°, 1.36×10^{-3} at 0°; (second) = 2.0×10^{-6} at 25°. Decomp. above 140° \rightarrow acetic acid. Sublimes undecomp. under 8-10 mm. press. $\text{KMnO}_4 \rightarrow$ formic acid + CO_2 .

Di-Me ester : see Dimethyl malonate.

Mono-Et ester: $C_5H_8O_4$. MW, 132. B.p. $147^\circ/21$ mm. D_0^{20} 1.201, D_{15}^{19} 1.1759. Sol. H_2O , Et_2O . n_D^{20} 1.4275. $k = 4.51 \times 10^{-4}$ at 25° . Heat above $150^\circ \rightarrow$ diethyl malonate + $CH_3CO-OC_2H_5 + CH_3-COOH + CO_2$. **Propyl ester:** $C_8H_{14}O_4$. MW, 174. B.p. 211° . D_0^{20} 1.04977. **l-Menthyl ester:** b.p. $161-4^\circ/11$ mm. $[\alpha]_D -59.7^\circ$ in $EtOH$, -61.7° in $CHCl_3$.

Di-Et ester: see Diethyl malonate.

Mono-propyl ester: $C_8H_{10}O_4$. MW, 146. B.p. $118.5^\circ/3$ mm. D_0^{20} 1.1326. n_D^{20} 1.4301.

Dipropyl ester: $C_9H_{10}O_4$. MW, 182. B.p. $228-9^\circ/770.3$ mm., 229.2° . D_0^{20} 1.02705, D^{20} 1.0088. n_D^{20} 1.4206.

Mono-butyl ester: $C_7H_{12}O_4$. MW, 160. B.p. $132^\circ/3$ mm. D_0^{20} 1.0932. n_D^{20} 1.4328.

Dibutyl ester: $C_{11}H_{20}O_4$. MW, 216. B.p. 251.5° , $140^\circ/18$ mm. D_0^{20} 1.0049, D^{20} 0.9810. n_D^{20} 1.4262.

Di-l-menthyl ester: needles from $MeOH$. M.p. 61° . $[\alpha]_D -71.3^\circ$ in $EtOH$, -79.24° in $CHCl_3$.

Di-phenyl ester: $C_{15}H_{12}O_4$. MW, 256. Needles from $EtOH$. M.p. 50° . B.p. $210^\circ/15$ mm. with decomp.

Di-2-naphthyl ester: m.p. $146-7^\circ$.

p-Nitrobenzyl ester: m.p. 85.5° . Spar. sol. boiling $EtOH$.

p-Phenylphenacyl ester: m.p. 175° .

Anhydride: see Carbon suboxide.

Monoamide: see Malonamic Acid.

Diamide and substituted diamides: see Malonamide.

Amide-nitrile: see under Cyanoacetic Acid.

Dinitrile: see Malonitrile.

Mono-nitrile: see Cyanoacetic Acid.

Monochloride: $C_3H_3O_3Cl$. MW, 122.5. Needles from $CHCl_3$ -pet. ether or CS_2 . M.p. 65° decomp. Sol. Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. pet. ether, CS_2 . **Me ester:** $C_4H_5O_3Cl$. MW, 136.5. B.p. $71^\circ/15$ mm., $63-4^\circ/10$ mm.

Dichloride: see Malonyl chloride.

Monoanilide: see Malonanilic Acid.

Dianilide: see Malonanilide.

Amide-anilide: see under Malonamide.

Mono-o-toluidide: *N*-o-tolylmalamic acid. Needles from H_2O or $EtOH$. M.p. $138-43^\circ$ decomp. Sol. H_2O , $EtOH$. **Et ester:** cryst. from Et_2O -ligroin. M.p. 78° ($73-4^\circ$).

Mono-m-toluidide: *N*-m-tolylmalamic acid. Plates. M.p. $99-101^\circ$.

Mono-p-toluidide: *N*-p-tolylmalamic acid. Cryst. from $EtOH$. M.p. 86° . **Et ester:** plates + $\frac{1}{2}H_2O$ from $EtOH.Aq$. M.p. 144° , anhyd. $163-4^\circ$.

Di-o-toluidide: needles from $AcOH-AcOEt$.

M.p. 193° ($184-5^\circ$). Sol. $AcOH$. Spar. sol. $EtOH$, $AcOEt$.

Di-p-toluidide: cryst. M.p. 250° . Sol. $AcOH$. Spar. sol. $EtOH$.

Dihydrazide: plates from $EtOH$. M.p. 154° . Very sol. H_2O , $AcOH$. Sol. $EtOH$. Spar. sol.

Me_2CO , Et_2O , C_6H_6 , $CHCl_3$, ligroin.

Diacetylhydrazide: cryst. from $EtOH.Aq$. M.p. 229° . Sol. hot H_2O . Spar. sol. $EtOH$. $AcOH$. Insol. Me_2CO , C_6H_6 , $CHCl_3$, ligroin.

Ureide: see Malonuric Acid.

Anil: see Malonanil.

Freund, *Ber.*, 1884, 17, 780.

Rügenheimer, Hoffmann, *Ber.*, 1885, 18, 2971.

Wiens, *Ann.*, 1889, 253, 299.

Bülöw, Weidlich, *Ber.*, 1906, 39, 3373.

Staudinger, Becker, *Ber.*, 1917, 50, 1019.

Contzen-Crowet, *Bull. soc. chim. Belg.*, 1926, 35, 165.

Faltis, Pirsch, Bermann, *Ber.*, 1930, 63, 696.

Drake, Sweeny, *J. Am. Chem. Soc.*, 1932, 54, 2059.

Fischer, *Anleitung zur Darstellung organischer Präparate*, 8 [Braunschweig 1908], 43.

Bischoff, v. Hedenström, *Ber.*, 1902, 35, 3455.

Malonic Dialdehyde.

See Malondialdehyde.

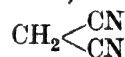
Malonic Ester.

See Diethyl malonate.

Malonic Semi-aldehyde.

See Formylacetic Acid.

Malonitrile (*Cyanoacetic nitrile*, *methylene cyanide*, *dicyanomethane*)



$C_3H_2N_2$ MW, 66

Cryst. M.p. $29-30^\circ$. B.p. $218-19^\circ$, $109^\circ/20$ mm., $99^\circ/11$ mm. Sol. H_2O , $EtOH$, Et_2O , C_6H_6 . Mod. sol. $CHCl_3$, $AcOH$. $n_D^{24.2}$ 1.41463. Conc. $HCl \rightarrow$ malonic acid. Poisonous.

Hesse, *Am. Chem. J.*, 1896, 18, 726.

Malonuric Acid (*Allophanylacetic acid*)

$NH_2 \cdot CO \cdot NH \cdot CO \cdot CH_2 \cdot COOH$
 $C_4H_6O_4N_2$ MW, 146

Et ester: $C_6H_{10}O_4N_2$. MW, 174. Prisms from H_2O . M.p. 128° . Sol. $EtOH$, $AcOEt$. Spar. sol. H_2O , Et_2O , C_6H_6 , ligroin. $NaOH \rightarrow$ barbituric acid.

Amide: $C_4H_7O_3N_3$. MW, 145. Needles from H_2O . $NaOH \rightarrow$ barbituric acid.

Nitrile: cyanoacetylurea. $C_4H_5O_2N_3$. MW, 127. Cryst. from H_2O . M.p. 212° (209°).

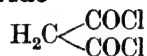
N-Formyl: cryst. from H_2O . M.p. $189-90^{\circ}$. Spar. sol. hot H_2O , EtOH, AcOH.

v. Gorski, *Ber.*, 1896, **29**, 2046.

Böhringer, D.R.P., 193,447, (*Chem. Zentr.*, 1908, I, 1000).

Conrad, Schulze, *Ber.*, 1909, **42**, 741.

Malonyl chloride



$C_3H_2O_2Cl_2$ MW, 141

B.p. $58^{\circ}/26$ mm., $53-4^{\circ}/19$ mm. $D_4^{18.6}$ 1.4486, $D_4^{22.9}$ 1.4505. $n_D^{18.4}$ 1.45915. $n_D^{22.1}$ 1.462.

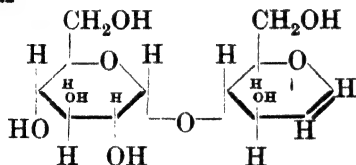
Auwers, Schmidt, *Ber.*, 1913, **46**, 477.

Staudinger, Bereza, *Ber.*, 1908, **41**, 4463.

Malonylurea.

See Barbituric Acid.

Maltal



$C_{12}H_{20}O_9$ MW, 308

Syrup. Does not reduce Fehling's. Perbenzoic acid \rightarrow 4- α -glucosido- β -mannose.

Hexa-acetyl: $C_{24}H_{32}O_{15}$. MW, 560. Prisms from MeOH. M.p. $131-3^{\circ}$. $[\alpha]_D^{20} + 68^{\circ}$ in $CHCl_3$. Sol. $CHCl_3$. Spar. sol. EtOH. Insol. pet. ether, H_2O . Does not reduce Fehling's.

Haworth, Hirst, Reynolds, *J. Chem. Soc.*, 1934, 302.

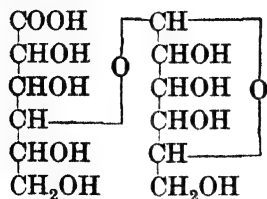
ψ -Maltal

$C_{12}H_{20}O_9$ MW, 308

Penta-acetyl: $C_{22}H_{30}O_{14}$. MW, 518. Needles from Et_2O -MeOH. M.p. 129° . $[\alpha]_D^{20} + 162^{\circ}$ in $CHCl_3$. Sol. $CHCl_3$, EtOH. Spar. sol. hot H_2O . Reduces Fehling's in hot.

See previous reference.

Maltobionic Acid



$C_{12}H_{22}O_{12}$ MW, 358

Syrup. Misc. with H_2O in all proportions. Insol. EtOH, AcOEt, boiling Et_2O . $[\alpha]_D^{20} + 98.3^{\circ}$

in H_2O . Dil. $H_2SO_4 \rightarrow$ gluconic acid + glucose.

Brucine salt: cryst. from H_2O -EtOH. M.p. 153° . $[\alpha]_D^{20} + 38.05^{\circ}$ in H_2O .

Me ester of octa-Me ether: methyl octamethyl-maltobionate. $C_{21}H_{40}O_{12}$. MW, 484. Pale yellow viscous liq. B.p. $170-3^{\circ}/0.05$ mm. n_D^{14} 1.4620.

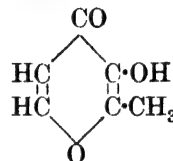
Haworth, Peat, *J. Chem. Soc.*, 1926, 3094.

Glattfeld, Hanke, *J. Am. Chem. Soc.*, 1918, **40**, 973.

Maltobiase.

See Maltose.

Maltol (3-Hydroxy-2-methyl- γ -pyrone, laricin, laricinic acid, larixinic acid)



$C_6H_6O_3$ MW, 126

Occurs in larch bark and chicory. Needles from toluene. M.p. $162-4^{\circ}$ (153°). Easily sol. hot H_2O , $CHCl_3$. Less sol. cold EtOH. Spar. sol. Et_2O , C_6H_6 . Insol. pet. ether. Yellow sols. in alkalis. Sublimes in prisms at 93° . Reduces NH_3 , $AgNO_3$ and warm Fehling's. $FeCl_3 \rightarrow$ reddish-violet col. Reacts acid to litmus.

Me ether: $C_7H_8O_3$. MW, 140. Oil. B.p. $114^{\circ}/15$ mm. Heat with NH_3 . Aq. \rightarrow 4-hydroxy-3-methoxy- α -picoline.

Benzoyl: needles from EtOH.Aq. M.p. $115-16^{\circ}$. Sol. EtOH. Mod. sol. H_2O .

Carbanilide: $C_{13}H_{11}O_4N$. MW, 245. Needles from AcOEt. M.p. $149-50^{\circ}$. Sublimes.

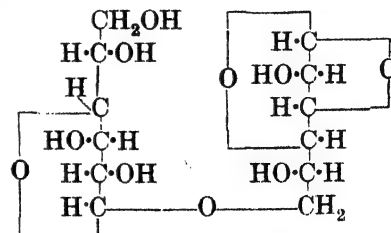
Stenhouse, *Ann.*, 1862, **123**, 191.

Peratoner, Lamburello, *Gazz. chim. ital.*, 1906, **36**, 37.

Feuerstein, *Ber.*, 1901, **34**, 1804.

Reichstein, Beitter, *Ber.*, 1930, **63**, 824.

Maltosan



Proposed formula

$C_{12}H_{20}O_{10}$

MW, 324

Amorphous powder. M.p. about 145–50°. Sol. H_2O , MeOH, Py, hot AcOH. Insol. other org. solvents. $[\alpha]_D^{20} + 75.8^\circ$ in H_2O . Reduces Fehling's in hot. Decomp. on dist. at 2 mm. 90% EtOH + MeONa in cold \rightarrow β -methyl-maltoside.

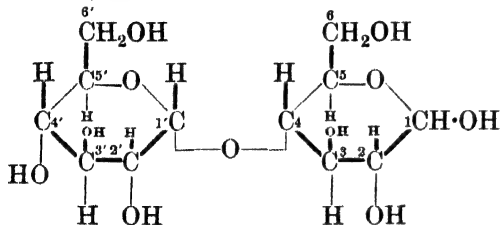
Osazone: m.p. 206°. Identical with maltose osazone.

Hydrochloride: hygroscopic solid.

Hexa-acetate: m.p. 95°.

Pictet, Marfort, *Helv. Chim. Acta*, 1923, 6, 129.

Maltose (Glucose-4- α -glucoside, malt sugar, maltobiose)



$\text{C}_{12}\text{H}_{22}\text{O}_{11}$

MW, 342

Occurs in nature as decomp. product of starch. Needles + H_2O . Loses H_2O at 100°. M.p. 160–5°. $[\alpha]_D^{21} + 116.9^\circ$ in H_2O initially, + 128.6° on standing. Very sol. H_2O . Insol. EtOH, Et₂O. Reduces Fehling's and $\text{NH}_3\cdot\text{AgNO}_3$. Dil. min. acids or maltase \rightarrow glucose. Br water \rightarrow maltobionic acid. Fermented by yeast.

Phenylhydrazone: m.p. 130° decomp.

2-Naphthylhydrazone: m.p. 176°.

Phenylosazone: yellow needles from AcOH. M.p. 206°.

p-Bromophenylosazone: yellow needles from EtOH. M.p. 198°.

p-Iodophenylosazone: m.p. 208° decomp.

p-Nitrophyenylosazone: red needles from Py-Et₂O. M.p. 261° decomp.

β -Methylglucoside: $\text{C}_{13}\text{H}_{24}\text{O}_{11}$. MW, 356. Cryst. + H_2O from dil. EtOH. M.p. 110–11°, anhyd. 155° decomp. $[\alpha]_D^{19} + 76.0^\circ$ in H_2O . **Heptamethyl ether**: $\text{C}_{20}\text{H}_{38}\text{O}_{11}$. MW, 454. Syrup. B.p. 189–90°/0.09 mm. $n_D^{20} 1.4698$. $[\alpha]_D^{20} + 89.5^\circ$ in MeOH. **Hepta-acetyl**: needles. M.p. 128–9°. $[\alpha]_D^{20} + 53.5^\circ$ in CHCl_3 .

β -Ethylglucoside: $\text{C}_{14}\text{H}_{26}\text{O}_{11}$. MW, 370. Cryst. from MeOH–AcOEt. M.p. 168–9°. $[\alpha]_D^{18.5} + 79.22^\circ$ in H_2O . Sol. H_2O , EtOH. Prac. insol. Et₂O, CHCl_3 , Me₂CO. **Hepta-acetyl**: prisms from EtOH. M.p. 132°. $[\alpha]_D^{14} + 48.93^\circ$.

Octa-acetyl: α -form, cryst. from EtOH. M.p. 125°. $[\alpha]_D^{20} + 122.77^\circ$ in CHCl_3 . **β -Form**: needles from EtOH. M.p. 160–1°. $[\alpha]_D^{20} + 62.59^\circ$ in CHCl_3 .

Fluorohepta-acetyl: prisms from dil. EtOH. M.p. 174–5°. $[\alpha]_D^{20} + 111.1^\circ$.

Chlorohepta-acetyl: prisms. M.p. 125°. $[\alpha]_D^{20} + 159.5^\circ$ in CHCl_3 .

Bromohepta-acetyl: prisms from ligroin. M.p. 112–13°. $[\alpha]_D^{20} + 180.1^\circ$ in CHCl_3 .

Irvine, Dick, *J. Chem. Soc.*, 1919, 115, 593.

Haworth, Leitch, *ibid.*, 809.

Haworth, Peat, *J. Chem. Soc.*, 1926, 3094.

Haworth, Loach, Long, *J. Chem. Soc.*, 1927, 3146.

Pictet, Vogel, *Helv. Chim. Acta*, 1927, 10, 588.

Brauns, *J. Am. Chem. Soc.*, 1929, 51, 1820.

Zemplén, *Ber.*, 1927, 60, 1555.

Josephson, *Ann.*, 1929, 472, 230.

Herzfeld, *Ann.*, 1883, 220, 206.

Harding, *Sugar*, 1923, 25, 350 (*Bibl.*).

Maltosimine

$\text{C}_{12}\text{H}_{23}\text{O}_{10}\text{N}$

MW, 341

Needles from MeOH. M.p. 165° decomp. $[\alpha]_D^{20} + 118^\circ$ in H_2O .

Lobry de Bruyn, Leent, *Rec. trav. chim.*, 1895, 14, 138.

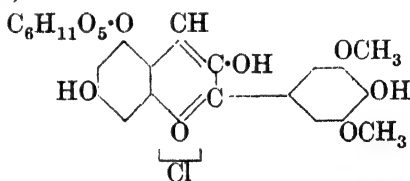
Malt sugar.

See Maltose.

Malyureidic Acid.

See 5-Hydantoinacetic Acid.

Malvenin chloride (5- β -Glucosidomalvidin chloride)



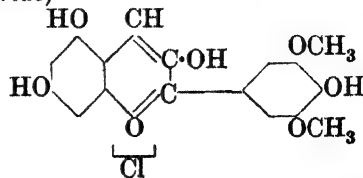
$\text{C}_{23}\text{H}_{25}\text{O}_{12}\text{Cl}$

MW, 528.5

Brownish-violet cryst. + 2 H_2O from EtOH–HCl.Aq. $\text{Na}_2\text{CO}_3 \rightarrow$ greenish-blue sol.

Léon, Robinson, *J. Chem. Soc.*, 1932, 2221.

Malvidin chloride (3':5'-Dimethyldelphinidin chloride)



$\text{C}_{17}\text{H}_{15}\text{O}_7\text{Cl}$

MW, 366.5

Prisms + $1\text{H}_2\text{O}$ from EtOH-HCl.Aq. Red by transmitted light, green by reflected light.

5-Benzoyl: prisms from MeOH-HCl.Aq. Olive-green with golden lustre. Mod. sol. MeOH . Spar. sol. EtOH . $\text{Na}_2\text{CO}_3 \rightarrow$ blue sol.

5- β -Glucoside: see Malvenin chloride.

Bradley, Robinson, *J. Chem. Soc.*, 1928, 1541.

Malvin chloride

$\text{C}_{29}\text{H}_{35}\text{O}_{17}\text{Cl}$ MW, 690.5

Digluconide of malvidin chloride. Reddish-brown powder. Purplish-red sol. in MeOH . Mod. sol. EtOH , amyl alcohol. Orange-red sol. in conc. H_2SO_4 . No col. with FeCl_3 .

Willstätter, Mieg, *Ann.*, 1915, 408, 122.

Robinson, Todd, *J. Chem. Soc.*, 1932, 2299.

Malvone

$\text{C}_{29}\text{H}_{36}\text{O}_{19}$ MW, 688

Cryst. + $1\text{H}_2\text{O}$ from H_2O . M.p. 220–30°. Reduces warm Fehling's. No col. with FeCl_3 .

Phenylhydrazine deriv.: cryst. from EtOH.Aq. M.p. 204°.

Karrer et al., *Helv. Chim. Acta*, 1927, 10, 744.

Karrer, de Meuron, *Helv. Chim. Acta*, 1932, 15, 507.

Mandelamide (Mandelic acid amide)



$\text{C}_8\text{H}_9\text{O}_2\text{N}$ MW, 151

d.

Plates from C_6H_6 . M.p. 123–4° (122–122.5°). $[\alpha]_D^{22} = 66.6^\circ$ in Me_2CO , $[\alpha]_D^{17} = 72.4^\circ$ in Me_2CO .

Me ether: $\text{C}_9\text{H}_{11}\text{O}_2\text{N}$. MW, 165. Plates from pet. ether. M.p. 108–9°. $[\alpha]_D^{18} = 103.6^\circ$ in Me_2CO .

N-Di-Me: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. M.p. 151–2°. $[\alpha]_D^{18} = 162^\circ$. Me ether: $\text{C}_{11}\text{H}_{15}\text{O}_2\text{N}$. MW, 193. B.p. 110°/0.6 mm. $[\alpha]_D^{18} = 14.33^\circ$. Rotation varies considerably with temp.

N-Et: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Plates from CHCl_3 -pet. ether. M.p. 65.5–66.5°. $[\alpha]_D^{18} = 103.6^\circ$ in Me_2CO .

Acetone deriv.: m.p. 126°. $[\alpha]_D^{17.8} = 95^\circ$ in Me_2CO , -81° in EtOH .

l.

Cryst. M.p. 122–122.5°. $[\alpha]_D^{19} + 74.7^\circ$ in Me_2CO .

dl.

Plates from C_6H_6 or EtOH . M.p. 133–4°. Spar. sol. Et_2O .

Me ether: plates from H_2O or Et_2O . M.p.

112–14°. Sol. EtOH , C_6H_6 . Spar. sol. H_2O , Et_2O .

Et ether: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Needles from H_2O or Et_2O . M.p. 93–4°. Very sol. EtOH , C_6H_6 . Spar. sol. H_2O , pet. ether.

Allyl ether: $\text{C}_{11}\text{H}_{13}\text{O}_2\text{N}$. MW, 191. M.p. 77–8°.

Phenyl ether: $\text{C}_{14}\text{H}_{13}\text{O}_2\text{N}$. MW, 227. Needles from H_2O or EtOH . M.p. 154–5°. Sol. EtOH , C_6H_6 . Spar. sol. H_2O , Et_2O , ligroin.

O-Acetyl: needles from H_2O . M.p. 112–13°.

N-Benzylidene: prisms from EtOH . M.p. 123°.

O-Benzoyl: needles from H_2O or EtOH.Aq. M.p. 164°. N-Me: needles from H_2O or EtOH.Aq. M.p. 139°.

N-Di-Me: m.p. 158°. Me ether: m.p. 41°.

N-Et: plates from C_6H_6 -pet. ether. M.p. 53–4°. Sol. H_2O , EtOH , Me_2CO , Et_2O , C_6H_6 . Spar. sol. pet. ether.

N-Benzylidene: prisms from EtOH or AcOH . M.p. 195°. Spar. sol. EtOH . Insol. Et_2O .

N-Anisylidene: cryst. from EtOH . M.p. 182°. Insol. H_2O , Et_2O , ligroin.

Prior to 1923 confusion existed between the d- and l-forms of mandelamide. See Freudenberg, Brauns, Siegel, *Ber.*, 1923, 56, 196, and Freudenberg, Markert, *Ber.*, 1925, 58, 1753.

McKenzie, Wren, *J. Chem. Soc.*, 1908, 93, 311.

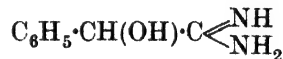
Wren, *J. Chem. Soc.*, 1909, 95, 1583.

McKenzie, Martin, Rule, *J. Chem. Soc.*, 1914, 105, 1586.

Gesellschaft für Chemische Industrie, Basel, D.R.P., 256,756, (*Chem. Zentr.*, 1913, I, 974).

Freudenberg, Todd, Seidler, *Ann.*, 1933, 501, 210.

dl-Mandelamidine (Mandelic acid amidine)



$\text{C}_8\text{H}_{10}\text{ON}_2$ MW, 150

Needles from Et_2O . M.p. 110°. Sol. H_2O , EtOH . Spar. sol. Et_2O , C_6H_6 . Reacts strongly alkaline.

B,HCl: prisms from H_2O . M.p. 219–20° (213–14°).

B,HNO₃: cryst. M.p. 154° decomp.

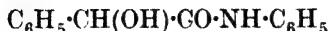
Mandelic acid salt: plates from EtOH . M.p. 185–7° decomp. Sol. EtOH . Spar. sol. MeOH , H_2O . Insol. Et_2O , C_6H_6 , pet. ether.

N:N'-Diacetyl: cryst. from EtOH . M.p. 210°. Spar. sol. Et_2O , ligroin.

Rule, *J. Chem. Soc.*, 1918, 113, 12.

Beyer, *J. prakt. Chem.*, 1885, 81, 387.

dl-Mandelanilide (*Anilide of dl-mandelic acid*)



$\text{C}_{14}\text{H}_{13}\text{O}_2\text{N}$ MW, 227

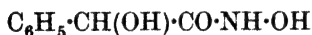
Plates from H_2O or EtOH, needles from AcOH. M.p. $151-2^\circ$ (146°). Sol. EtOH. Spar. sol. cold H_2O , Et_2O , CHCl_3 , AcOH, ligroin, CS_2 .

O-Acetyl: needles from EtOH.Aq. M.p. 117.5° .

Anschütz, Bocker, *Ann.*, 1909, **368**, 61.

Bischoff, Walden, *Ann.*, 1894, **279**, 123.

Mandelhydroxamic Acid (*Hydroxyamide of mandelic acid*)



$\text{C}_8\text{H}_9\text{O}_3\text{N}$ MW, 167

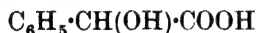
Plates from EtOH. M.p. 147° decomp. (132°). Sol. MeOH. Mod. sol. Et_2O . Spar. sol. C_6H_6 . Heat at m.p. or boil with $\text{H}_2\text{O} \rightarrow$ benzaldehyde. $\text{FeCl}_3 \rightarrow$ red col. Cu salt + alkali \rightarrow violet col. Ni salt + alkali \rightarrow reddish-yellow col.

Benzoyl deriv.: cryst. from EtOH. M.p. $101-2^\circ$. Decomp. by H_2O .

Angeli, Alessandri, *Atti accad. Lincei*, 1914, **23**, 104.

Jones, Neuffer, *J. Am. Chem. Soc.*, 1917, **39**, 666.

Mandelic Acid (α -Hydroxyphenylacetic acid, phenylglycollic acid)



$\text{C}_8\text{H}_8\text{O}_3$ MW, 152

d-.

Plates. M.p. 133° . $[\alpha]_D^{20} - 159.73^\circ$ in EtOH, $[\alpha]_D^{20} - 187.44^\circ$ in AcOH. Sol. H_2O . $k = 4.3 \times 10^{-4}$ at 25° . Slowly racemises at 160° .

Me ether: *d*- α -methoxyphenylacetic acid. $\text{C}_9\text{H}_{10}\text{O}_3$. MW, 166. Needles from pet. ether. M.p. $63-4^\circ$. $[\alpha]_D^{15} - 165.8^\circ$ in H_2O , -150.0° in EtOH. *K* salt: $[\alpha]_D^{15} - 98.2^\circ$ in H_2O . *Na* salt: spar. sol. H_2O . $[\alpha]_D^{15} - 106.5^\circ$ in H_2O . *Ca* salt: prisms, Spar. sol. H_2O . $[\alpha]_D^{15} - 98.4^\circ$ in H_2O . *Me* ester: $\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. B.p. $117.5-118^\circ/8$ mm. $[\alpha]_D^{20} - 101.7^\circ$ in CS_2 , $[\alpha]_D^{15} - 96.3^\circ$ in Me_2CO . *Chloride*: $\text{C}_9\text{H}_9\text{O}_2\text{Cl}$. MW, 184.5. B.p. $98^\circ/11$ mm. $[\alpha]_D^{15} - 45^\circ$, $[\alpha]_D^{16} - 72^\circ$. Easily decomp.

Et ether: *d*- α -ethoxyphenylacetic acid. $\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. Syrup. $[\alpha]_D^{15} - 90.8^\circ$ in Me_2CO . *Na* salt: $[\alpha]_D^{15} - 82.2^\circ$ in H_2O . *Ba* salt: $[\alpha]_D^{15} - 70.7^\circ$ in H_2O . *Et* ester: $\text{C}_{12}\text{H}_{14}\text{O}_3$. MW, 208. B.p. $146-7^\circ/17-20$ mm. $D_4^{21.5} 1.0429$. $[\alpha]_D^{21.5} - 32.32^\circ$.

Isopropyl ether: $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. Oil. Solidifies to prisms in vacuo. $[\alpha]_D^{18} - 84.8^\circ$ in Me_2CO . *Na* salt: $[\alpha]_D^{15} - 67.0^\circ$ in H_2O . *K* salt: $[\alpha]_D^{15} - 61.9^\circ$ in H_2O .

Acetyl: *d*- α -acetoxyphenylacetic acid. Needles + $1\text{H}_2\text{O}$ from H_2O . M.p. anhyd. $96.5-98^\circ$. Anhyd. sol. EtOH, Et_2O , Me_2CO , CHCl_3 . Mod. sol. C_6H_6 . Spar. sol. H_2O , CCl_4 , pet. ether. $[\alpha]_D^{20}$ (anhyd.) -156.4° in Me_2CO , $[\alpha]_D^{15} - 157.7^\circ$ in EtOH. *Me* ester: b.p. $177^\circ/45$ mm. $D_4^{20} 1.1546$. $[\alpha]_D^{15} - 160^\circ$ in C_6H_6 , -148° in CHCl_3 , -124.7° in MeOH.

Me ester: $\text{C}_9\text{H}_{10}\text{O}_3$. MW, 166. Cryst. M.p. 55° . B.p. $135^\circ/12$ mm. $D_4^{20} 1.1756$. $[\alpha]_D^{15} - 214^\circ$ in CS_2 , -173° in C_6H_6 , -167° in CHCl_3 , -143° in MeOH, -121° in Me_2CO . *Propionyl*: b.p. $184^\circ/45$ mm. $D_4^{20} 1.1261$. $[\alpha]_D^{20} - 135.5^\circ$.

Et ester: $\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. M.p. 35° . B.p. $150^\circ/21$ mm. $D_4^{20} 1.1270$. $[\alpha]_D^{20} - 180^\circ$ in CS_2 , -128.4° in CHCl_3 , -90.62° in Me_2CO . *Propionyl*: m.p. 33° . B.p. $177^\circ/30$ mm. $D_4^{20} 1.0936$. $[\alpha]_D^{20} - 131.5^\circ$ in CS_2 , -109.4° in CHCl_3 . *Butyryl*: $D_4^{20} 1.071$. *Valeryl*: b.p. $173.4^\circ/18$ mm. $D_4^{20} 1.0544$. $[\alpha]_D^{20} - 116.9^\circ$ in CS_2 .

Propyl ester: $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. M.p. 24° . $D_4^{20} 1.1005$.

Butyl ester: $\text{C}_{12}\text{H}_{16}\text{O}_3$. MW, 208. M.p. 31° . $D_4^{20} 1.0720$.

Isobutyl ester: m.p. 36° . B.p. $159^\circ/19$ mm. $D_4^{20} 1.0870$. $[\alpha]_D^{20} - 146.6^\circ$ in CS_2 .

dl-Amly ester: $\text{C}_{13}\text{H}_{18}\text{O}_3$. MW, 222. B.p. $166-7^\circ/17$ mm. $D_4^{20} 1.0531$. $[\alpha]_D^{20} - 96.46^\circ$.

l-Menthyl ester: needles from EtOH. M.p. $81-2^\circ$. $[\alpha]_D^{17} - 138.6^\circ$ in EtOH ($[\alpha]_D^{20} - 140.92^\circ$ in EtOH). Acetyl: needles from EtOH.Aq. M.p. $45-6^\circ$. Sol. Et_2O , EtOH, C_6H_6 , CHCl_3 , pet. ether, CCl_4 , CS_2 , AcOMe, heptane. Spar. sol. H_2O . $[\alpha]_D^{15} - 123.1^\circ$ in EtOH. Benzoyl: plates. M.p. $54-5^\circ$. $[\alpha]_D^{15} - 119.8^\circ$ in EtOH.

l-Bornyl ester: prisms from EtOH. M.p. 78° . Very sol. org. solvents. Insol. H_2O . $[\alpha]_D^{20.5} - 84.2^\circ$ in EtOH.

Acetone deriv.: m.p. 75° . $[\alpha]_{D_{75}}^{18} - 99^\circ$ in MeOH.

Nitrile: *d*-mandelonitrile, *d*-benzaldehyde cyanhydrin. $\text{C}_8\text{H}_7\text{ON}$. MW, 133. Needles. M.p. $28.5-29.5^\circ$. $[\alpha]_{D_{28.5}}^{22} + 46.9^\circ$ in C_6H_6 . Conc. $\text{H}_2\text{SO}_4 \rightarrow$ magenta-red col.

l-.

Plates. M.p. 133.8° . Sol. H_2O , CHCl_3 . $[\alpha]_D^{20} + 156.57^\circ$ in H_2O . Heat at 160° for 30 hours \rightarrow dl-form.

Me ether: *l*- α -methoxyphenylacetic acid. $[\alpha]_D + 54^\circ$ in EtOH.

l-Menthyl ester: plates from EtOH. M.p. 99–100°. $[\alpha]_D^{17.5} - 9.45^\circ$ in EtOH. Acetyl: needles. M.p. 44.5–45°. $[\alpha]_D^{19} + 8.8^\circ$ in EtOH.

l-Bornyl ester: needles. M.p. 50–1°. Very sol. org. solvents. Insol. H₂O. $[\alpha]_D^{19} + 23.2^\circ$ in EtOH.

dl.

Plates from H₂O. M.p. 118–19°. Very sol. EtOH, Et₂O. Mod. sol. H₂O. $k = 4.17 \times 10^{-4}$ at 25°. D_4^{20} 1.300.

Me ether: *dl*- α -methoxyphenylacetic acid. C₉H₁₀O₃. MW, 166. Plates from ligroin. M.p. 71–2°. Sol. EtOH, Et₂O. Spar. sol. H₂O, ligroin. $k = 7.4 \times 10^{-4}$ at 25°. *Me ester*: C₁₀H₁₂O₃. MW, 180. Oil. B.p. 246°, 118–19°/8 mm. *Et ester*: C₁₁H₁₄O₃. MW, 194. Oil. B.p. 141°/26 mm., 131°/14 mm. D_4^{20} 1.1294. *Chloride*: C₈H₇O₂Cl. MW, 170.5. B.p. 80–1°/0.1 mm. Decomp. on dist. at 15 mm. *Nitrile*: C₉H₉ON. MW, 147. Oil. B.p. 116–18°/14 mm. Insol. H₂O.

Et ether: *dl*- α -ethoxyphenylacetic acid. C₁₀H₁₂O₃. MW, 180. B.p. 172–3°/17–18 mm. $k = 5.3 \times 10^{-4}$ at 25°. *Me ester*: C₁₁H₁₄O₃. MW, 194. B.p. 127–9°/14–15 mm. *Et ester*: C₁₂H₁₆O₃. MW, 208. B.p. 255°, 134°/13 mm. *l*-Menthyl ester: oil. B.p. 205°/17 mm. D_4^{20} 1.0007. $[\alpha]_D^{20} - 65.6^\circ$. *l*-Bornyl ester: oil. B.p. 204°/20 mm. D_4^{20} 1.0407. $[\alpha]_D^{20} - 27.5^\circ$. *Nitrile*: C₁₀H₁₁ON. MW, 161. B.p. 122–4°/16 mm. Sol. org. solvents. Spar. sol. H₂O.

Propyl ester: C₁₁H₁₄O₃. MW, 194. Yellow oil. $k = 4.9 \times 10^{-4}$ at 25°. *Et ester*: C₁₃H₁₈O₃. MW, 222. Oil. B.p. 144°/13 mm.

Phenyl ether: *dl*- α -phenoxyphenylacetic acid. C₁₄H₁₂O₃. MW, 228. Needles from hot H₂O. M.p. 108°. Very sol. EtOH, Et₂O. *Ureide*: needles from EtOH. M.p. 193°. Sol. EtOH, C₆H₆. Spar. sol. H₂O, Et₂O, ligroin.

Benzyl ether: C₁₅H₁₄O₃. MW, 242. Plates. M.p. 93°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Almost insol. H₂O.

Acetyl: *dl*- α -acetoxyphenylacetic acid. Cryst. from C₆H₆, m.p. 79–80°; cryst. + 1H₂O from H₂O, m.p. 38–9°. Easily sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. cold H₂O. *Et ester*: needles from Et₂O. M.p. 73.5–74°. Very sol. EtOH, Et₂O. Insol. H₂O. *l*-Menthyl ester: oil. B.p. 205°/7 mm. $[\alpha]_D^{15.5} - 57.0^\circ$ in EtOH. *Chloride*: b.p. 150–5°/33 mm. *Nitrile*: b.p. 152°/25 mm., 137–8°/11 mm.

Isovaleryl: cryst. from ligroin. M.p. 71°.

Me ester: C₉H₁₀O₃. MW, 166. Plates from C₆H₆-ligroin. M.p. 58°. B.p. 250° slight decomp., 144°/20 mm.

Et ester: C₁₀H₁₂O₃. MW, 180. Needles from pet. ether. M.p. 37°. B.p. 253–5°, 141°/15 mm. *Allyl ether*: C₁₃H₁₆O₃. MW, 220. B.p. 163–4°/24 mm. *Benzoyl*: b.p. 227°/20 mm.

Propyl ester: C₁₁H₁₄O₃. MW, 194. Needles. M.p. 14–15°. B.p. 263°, 145°/12 mm.

l-Menthyl ester: cryst. from pet. ether. M.p. 85–6°. B.p. 225°/30 mm. Sol. C₆H₆, EtOH. Spar. sol. pet. ether. Insol. H₂O. $[\alpha]_D^{16} - 74.2^\circ$ in EtOH. *Benzoyl*: needles from EtOH. M.p. 75–6°. $[\alpha]_D^{15} - 44.4^\circ$ in EtOH.

l-Bornyl ester: needles. M.p. 45–7°. B.p. 204°/14 mm. Very sol. most org. solvents. $[\alpha]_D^{20} - 30.4^\circ$ in EtOH.

Phenacyl ester: C₁₆H₁₄O₄. MW, 270. Cryst. from EtOH.Aq. M.p. 84–84.5°.

Tropine ester: see Homatropine.

Nitrile: *dl*-mandelonitrile, *dl*-benzaldehyde cyanhydrin. C₈H₇ON. MW, 133. Prisms. M.p. 21.5–22°. Sol. EtOH, Et₂O. Insol. H₂O. D_4^{20} 1.1165, D_4^{60} 1.0844. Heat at 170° → benzaldehyde + HCN. *Benzoyl*: needles from EtOH. M.p. 63–4°. Sol. org. solvents. *m*-Nitrobenzoyl: cryst. from Et₂O. M.p. 83–4°. *Cinnamoyl*: cryst. from EtOH.Aq. M.p. 47–8°. *Anisoyl*: cryst. from EtOH. M.p. 58–9°.

Hydrazide: plates. M.p. 132°. Sol. hot H₂O, hot EtOH. Insol. Et₂O, C₆H₆, ligroin. *Isopropylidene*: plates from EtOH. M.p. 134–5°. *Benzylidene*: needles. M.p. 149°. *Cinnamylidene*: needles from EtOH. M.p. 180°. *Salicylidene*: needles from EtOH. M.p. 179°.

o-Toluidide: C₁₅H₁₅O₂N. MW, 241. Cryst. from EtOH.Aq. M.p. 72°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃.

p-Toluidide: plates from EtOH. M.p. 172°. B.p. above 200°/10 mm.

1-Naphthalide: prisms. M.p. 140°. Sol. Me₂CO. Spar. sol. Et₂O, ligroin, CS₂.

2-Naphthalide: plates from EtOH. M.p. 189°. Spar. sol. H₂O, EtOH, Et₂O, C₆H₆, CHCl₃, ligroin, CS₂.

Phenetidide: see Amygdophenine.

Hydroxylamine salt: cryst. from EtOH-Et₂O. M.p. 125°. Sol. EtOH, H₂O. Insol. Et₂O.

Prior to 1923 confusion existed between the *d*- and *l*-forms of mandelic acid. See Freudenberg, Brauns, Siegel, *Ber.*, 1923, 56, 196, and Freudenberg, Markert, *Ber.*, 1925, 58, 1753.

Glucosides: see Prunasinic Acid, Sambunigrinic Acid, and Sambunigrin.

Gentiobioside: see Amygdalin.

Amide: see Mandelamide.

Hydroxy-amide: see Mandelhydroxamic Acid.

Amidine: see Mandelamidine.

Anilide: see Mandelanilide.

- Bischoff, Walden, *Ann.*, 1894, **279**, 129.
 Walden, *Z. physik. Chem.*, 1895, **17**, 708.
 McKenzie, *J. Chem. Soc.*, 1899, **75**, 757.
 Rimbach, *Ber.*, 1899, **32**, 2386.
 Curtius, Muller, *Ber.*, 1901, **34**, 2796.
 McKenzie, *J. Chem. Soc.*, 1904, **85**, 1254.
 Findlay, Turner, *J. Chem. Soc.*, 1905, **87**, 755.
 Francis, Davis, *J. Chem. Soc.*, 1909, **95**, 1404.
 McKenzie, Wren, *J. Chem. Soc.*, 1910, **97**, 484.
 Albert, *Ber.*, 1916, **49**, 1384.
 Hess, Dorner, *Ber.*, 1917, **50**, 391.
 Matheson, Blaikie, E.P., 264,143, (*Chem. Abstracts*, 1928, **22**, 91).
 Ausländer, *Chem. Zentr.*, 1930, II, 944.
 Smith, *Ber.*, 1931, **64**, 432.
 Freudenberg, Todd, Seidler, *Ann.*, 1933, **501**, 210.
 Thayer, *Organic Syntheses*, Collective Vol. I, 12.
 Corson, Dodge, Harris, Yeaw, *ibid.*, 329.

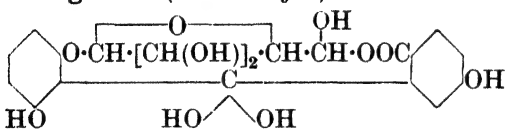
Mandelonitrile.

See under Mandelic Acid.

Mandelyltropine.

See Homatropine.

Mangiferin (*Euxanthogen*)



$C_{19}H_{18}O_{11}$ MW, 422

Occurs in leaves of *Mangifera indica*. Pale yellow needles + $3H_2O$ from EtOH.Aq. M.p. anhyd. 271° . $[\alpha]_D^{27} + 32.8^\circ$. Alc. $FeCl_3 \rightarrow$ green col. Reduces Fehling's on prolonged heating.

Di-Me ether: $C_{21}H_{22}O_{11}$. MW, 450. Cryst. M.p. 276° .

Hepta-acetyl: m.p. about 150° .

Gorter, *Chem. Abstracts*, 1923, **17**, 1472.

α -Mangostin

$C_{23}H_{24}O_6$ MW, 396

Pigment of *Garcinia mangostana*, Linn. Yellow needles from C_6H_6 . M.p. $180-1^\circ$. Very sol. EtOH, MeOH. Sol. $CHCl_3$, Me_2CO , AcOH, AcOEt, Py. Insol. H_2O . $FeCl_3 \rightarrow$ green col. Conc. $H_2SO_4 \rightarrow$ orange-red sol.

Me ether: $C_{24}H_{26}O_6$. MW, 410. Yellow plates. M.p. $171-2^\circ$. *Acetyl*: needles from AcOH. M.p. $193-4^\circ$.

Di-Me ether: $C_{25}H_{28}O_6$. MW, 424. Cryst. from EtOH. M.p. $121-2^\circ$.

Tri-Me ether: $C_{26}H_{30}O_6$. MW, 438. Yellow needles from EtOH. M.p. $99-100^\circ$.

Acetyl deriv.: yellow needles from EtOH. M.p. 112° .

Diacetyl deriv.: yellow prisms or plates from EtOH. M.p. 117° .

Triacetyl deriv.: cryst. from MeOH. M.p. $115-18^\circ$.

p-Nitrobenzoyl deriv.: yellow needles from EtOH- C_6H_6 . M.p. 147° . Sol. C_6H_6 , AcOH. Spar. sol. EtOH, Et_2O .

Dragendorff, *Ann.*, 1930, **482**, 280; 1931, **487**, 62.

Murakami, *Ann.*, 1932, **496**, 122.

β -Mangostin.

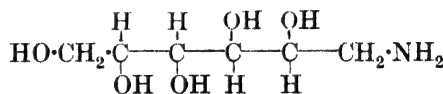
Pigment of *Garcinia mangostana*, Linn. Yellow needles from C_6H_6 . M.p. 175.5° .

Dragendorff, *Ann.*, 1930, **482**, 296.

Mannal.

See Glucal.

Mannamine



$C_6H_{15}O_5N$ MW, 181

Cryst. M.p. 139° . Sol. H_2O . Spar. sol. EtOH. $[\alpha]_D - 2^\circ$ in H_2O .

Oxalate: plates. M.p. 186° .

Acetylacetone deriv.: needles. M.p. 172° .

Roux, *Compt. rend.*, 1904, **138**, 504.

Maquenne, *Compt. rend.*, 1903, **137**, 659.

Mannan A

$(C_6H_{10}O_5)_n$ MW, $(162)_n$

Polysaccharide occurring in ivory nuts. $[\alpha]_D^{20} - 42.5^\circ$ in $N/NaOH$. Hyd. \rightarrow mannose.

Triacetyl deriv.: powder. M.p. $128-45^\circ$. $[\alpha]_D - 3.0^\circ$ in $CHCl_3$.

Patterson, *J. Chem. Soc.*, 1923, **123**, 1147.

Hess, Lüttke, *Ann.*, 1928, **466**, 18.

Mannan B

$(C_6H_{10}O_5)_n$ MW, $(162)_n$

Polysaccharide. Amorph. Hyd. \rightarrow mannose.

Acetyl deriv.: powder from $CHCl_3$ -EtOH. $[\alpha]_D^{17} - 25.2^\circ$ in $CHCl_3$.

Lüttke, *Ann.*, 1927, **456**, 213.

Klages, *Ann.*, 1934, **512**, 185.

Mannide

(C₆H₁₀O₄)_n MW, (146)_n

Thick syrup. Sol. H₂O, EtOH. Easily decomp. Long standing in air → mannitol.

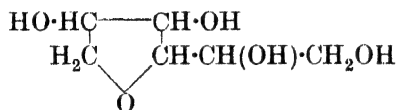
Dilaurate: cryst. from EtOH. M.p. 37.5°. Sol. Et₂O, C₆H₆. n_D^{40} 1.457. $[\alpha]_D^{20} + 125^\circ$ in C₆H₆ or Et₂O.

Distearate: needles from Et₂O. M.p. 51°. Sol. EtOH, Et₂O. Insol. H₂O. $[\alpha]_D^{20} + 64.8^\circ$ in C₆H₆.

Liebermann, *Ber.*, 1884, 17, 874.

Bloor, *J. Biol. Chem.*, 1912, 11, 423.

Carré, Maucière, *Compt. rend.*, 1931, 192, 1567.

Mannitan

Probable structure

C₆H₁₂O₅ MW, 164

Exists in two forms.

(i) Amorph. Sol. H₂O, EtOH. Insol. H₂O. Dextrorotatory. Long standing → mannitol.

(ii) Cryst. M.p. 137°. Sol. H₂O. Insol. EtOH. $[\alpha]_D^{14} - 23.5^\circ$ in H₂O. Boiling H₂O → mannitol. H₂O at 295° → amorph. form.

Di-Et ether: C₁₀H₂₀O₅. MW, 220. Syrup. Sol. EtOH, Et₂O. Insol. H₂O.

Diacetyl: syrup. Sol. H₂O, AcOH. Spar. sol. hot EtOH. Insol. Et₂O.

Dilaurate: needles from EtOH. M.p. 122°. Sol. hot EtOH. Spar. sol. Et₂O. $[\alpha]_D^{50} + 8.5^\circ$ in CHCl₃.

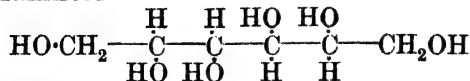
Distearate: needles from hot EtOH. M.p. 124°. Spar. sol. cold EtOH, C₆H₆. $[\alpha]_D^{50} + 8^\circ$ in CHCl₃.

Diacetone deriv.: plates. M.p. 155°.

Bouchardat, *Ann. chim. phys.*, 1875, 6, 103.

Bloor, *J. Biol. Chem.*, 1912, 11, 144, 421.

v. Rombergh, v. der Berg, *Chem. Zentr.*, 1923, I, 1086.

Mannitol

C₆H₁₄O₆ MW, 182

d.

Widely distributed in nature. Needles or prisms from H₂O. M.p. 166°. B.p. 290–5°/3–3.5 mm., 276–80°/1 mm. D^{25} 1.521. Sol. to 13% in H₂O at 14°, 1.2% in EtOH at 15°, 0.47%

in Py at 26°. Insol. Et₂O. $[\alpha]_D^{25} - 0.49^\circ$ in H₂O. Addition of borax to aq. sol. gives strongly dextrorotatory sol. Sweet taste. Triboluminescent. At 200° → amorph. mannitan. NaOH dist. → isomannide. C₂H₅Br + KOH at 100° → mannitan di-Et ether.

1:2-*Di-Me ether*: C₈H₁₈O₆. MW, 210. Needles from C₆H₆. M.p. 93°. Sol. H₂O, EtOH, Me₂CO. Spar. sol. Et₂O. $[\alpha]_D^{20} - 7.35^\circ$ in H₂O. *Diacetone deriv.*: b.p. 140–1°/13 mm. Sol. H₂O and most org. solvents. $[\alpha]_D^{20} + 25.7^\circ$ in H₂O, + 21.9° in EtOH.

1:2:3:4-*Tetra-Me ether*: C₁₀H₂₂O₆. MW, 238. Syrup. B.p. 167–9°/13 mm. Sol. pet. ether. $[\alpha]_D^{20} - 13.02^\circ$ in H₂O, – 12.54° in EtOH. 5-*Et ether*: C₁₂H₂₆O₆. MW, 266. B.p. 140–2°/8 mm. Sol. H₂O and most org. solvents. $[\alpha]_D^{20} + 8.9^\circ$ in EtOH. *Monoacetone deriv.*: b.p. 138–40°/11 mm. Sol. H₂O, org. solvents. $[\alpha]_D^{20} + 39.1^\circ$ in H₂O, + 32.2° in EtOH.

1:2:4:5-*Tetra-Me ether*: b.p. 177°/11 mm. $[\alpha]_D^{20} + 39.8^\circ$ in EtOH, + 38.5° in H₂O.

1:2:3:4:5-*Penta-Me ether*: C₁₁H₂₄O₆. MW, 252. B.p. 139–41°/12 mm., 142–4°/10 mm. n_D 1.443–6. $[\alpha]_D^{20} + 8.3$ –9.8° in EtOH, + 7.54° in H₂O.

2:3:4:5-*Tetra-acetyl*: cryst. from EtOH–pet. ether. M.p. 123–5°. $[\alpha]_D^{20} + 3^\circ$ in CHCl₃.

Hexa-acetyl: cryst. M.p. 119–20°.

2:3:4:5-*Tetrabenzoyl*: cryst. from C₆H₆–pet. ether. M.p. 155° (147°). $[\alpha]_D^{20} \pm 0^\circ$ in CHCl₃. 1:6-*Diacetyl*: cryst. from EtOH. M.p. 146°. 1:6-*Di-p-toluenesulphonyl*: cryst. from EtOH–AcOEt. M.p. 171°. Sol. Me₂CO, C₆H₆, CHCl₃, AcOH, hot Py. Spar. sol. EtOH, Et₂O, pet. ether.

Hexabenzoyl: m.p. 149–50°. $[\alpha]_D^{19} + 53.93^\circ$ in CHCl₃.

Hexagalloyl: dark brown amorph. solid. Sol. H₂O, EtOH, Me₂CO. Spar. sol. C₆H₆, CHCl₃. $[\alpha]_D^{18} + 27.0^\circ$ in EtOH.

Monosalicyloyl deriv.: cryst. from AcOEt. M.p. 148–9°. Sol. hot H₂O, hot EtOH. Spar. sol. C₆H₆. FeCl₃ → violet col.

Disalicyloyl deriv.: plates from AcOEt. M.p. 182–4°. Sol. Me₂CO, hot EtOH, AcOEt. Spar. sol. hot H₂O, C₆H₆, CHCl₃. FeCl₃ in EtOH.Aq. → intense reddish-violet col.

Diacetylsalicyloyl deriv.: cryst. from CHCl₃. M.p. 135–6°. Sol. warm EtOH, Me₂CO. Spar. sol. hot H₂O, hot C₆H₆, Et₂O. Bitter taste.

Dianisoyl deriv.: needles or plates from EtOH. M.p. 175–6°. Very sol. hot amyl alcohol, AcOH. Sol. hot EtOH, Me₂CO, AcOEt. Spar. sol. H₂O, hot CHCl₃.

Pentanitrate: needles from EtOH. M.p.

181–2°. Sol. 3000 parts H_2O at 15°, 500 parts H_2O at 60°, 0.66 parts EtOH at 12.8°, 0.76 parts Et_2O at 9°. Dextrorotatory. Explodes on concussion. Reduces Fehling's. $FeCl_3$ or $(NH_4)_2S \rightarrow$ mannitol.

Hexanitrate: "nitromannitol." Needles. M.p. 112–13°. Sol. warm EtOH, Et_2O , AcOH. Insol. H_2O . $D^{20} 1.604$. Dextrorotatory. Decomp. slowly at 100°. Explodes on concussion. $FeCl_3$, $(NH_4)_2S$, or HI \rightarrow mannitol.

Monoacetone deriv.: needles from C_6H_6 . M.p. 85°. Sol. H_2O , EtOH, Me_2CO . Spar. sol. boiling C_6H_6 . $[\alpha]_D^{20} + 26.4^\circ$ in H_2O , $+ 23.2^\circ$ in EtOH.

Diacetone deriv.: needles. M.p. 37–9°. Sol. H_2O , EtOH, Me_2CO , C_6H_6 . $[\alpha]_D^{20} + 19.31^\circ$ in H_2O , $+ 15.75^\circ$ in EtOH.

Triacetone deriv.: prisms from EtOH.Aq. M.p. 68–70°. Sol. EtOH, Et_2O , Me_2CO , $CHCl_3$, AcOEt. Spar. sol. H_2O . $[\alpha]_D^{20} + 12.5^\circ$ in EtOH. Volatile in steam.

l.

Needles. M.p. 163–4°. Very sol. H_2O . Spar. sol. EtOH, hot MeOH. Sweet taste.

dl.

See α -Acritol.

Fischer, *Ber.*, 1890, **23**, 383.

Wigner, *Ber.*, 1903, **36**, 796.

Irvine, Paterson, *J. Chem. Soc.*, 1914, **105**, 907.

Fischer, Bergmann, *Ber.*, 1916, **49**, 297.

Fenaroli, *Chem. Abstracts*, 1922, **16**, 2570.

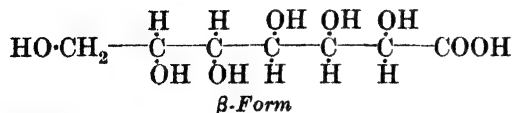
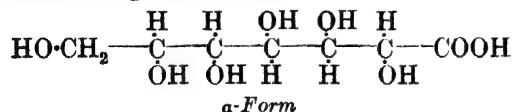
Micheel, *Ber.*, 1932, **65**, 263; *Ann.*, 1932, **496**, 90.

Müller, *Ber.*, 1932, **65**, 1052.

l- α -Mannoheptitol.

See under d-Galaheptitol.

Mannoheptonic Acid



$C_7H_{14}O_8$

MW, 226

d.

Exists in α and β forms.

α -Form.

Prisms from H_2O . M.p. 175° with formation of lactone. Sol. 24 parts H_2O at 30°.

Na salt: needles from H_2O . M.p. 220–5°.

NH₄ salt: needles from H_2O . M.p. 154°. $[\alpha]_D^{20} + 31.31^\circ$ initial, $+ 7.22^\circ$ final.

Phenylhydrazone: cryst. from H_2O . M.p. 220–3°.

Amide: $C_7H_{15}O_7N$. MW, 225. Cryst. from H_2O . M.p. 193–4°. $[\alpha]_D^{20} + 27.8^\circ$.

Nitrile: $C_7H_{13}O_6N$. MW, 207. Cryst. M.p. 121–2°. $[\alpha]_D^{20} + 31.4^\circ$ initial, $+ 23.11^\circ$ final.

Lactone: $C_7H_{12}O_7$. MW, 208. Needles from EtOH– Et_2O . M.p. 153–5°. $[\alpha]_D^{20} + 74.2^\circ$ in H_2O .

β -Form.

Not known in cryst. state. Very sol. H_2O . Spar. sol. EtOH. Insol. Et_2O .

Phenylhydrazone: needles from 70% EtOH. M.p. 190°. $[\alpha]_D^{27} - 25.8^\circ$.

l.

Free acid passes readily into lactone.

Ba salt: spar. sol. H_2O . Insol. EtOH.

Phenylhydrazone: cryst. from H_2O . M.p. 220° decomp.

Lactone: cryst. from EtOH. M.p. 153–5°. $[\alpha]_D^{20} + 75.15^\circ$. Very sol. H_2O . Spar. sol. abs. EtOH. Insol. Et_2O .

dl.

Free acid not known.

Ca salt: prisms from H_2O .

Phenylhydrazone: needles from H_2O . M.p. 225° decomp.

Lactone: cryst. from EtOH. M.p. 85°.

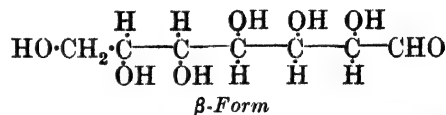
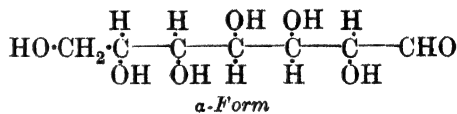
Smith, *Ann.*, 1893, **272**, 183.

Peirce, *J. Biol. Chem.*, 1915, **23**, 327.

Hudson, Monroe, *J. Am. Chem. Soc.*, 1919, **41**, 1140.

Miksic, *Chem. Abstracts*, 1929, **23**, 2941.

Mannoheptose



$C_7H_{14}O_7$

MW, 210

d.

Exists in α and β forms.

α -Form.

Needles from EtOH. M.p. 134–5°. Very sol. H_2O . Spar. sol. EtOH. $[\alpha]_D^{20} + 85.05^\circ$ initial, $+ 68.64^\circ$ final.

Phenylhydrazone: needles from H_2O . M.p. 197–200° decomp.

Phenylosazone: needles from EtOH. M.p. 200° decomp.

Hexa-acetyl: two forms. (i) Cryst. from 50% EtOH. M.p. 106°. $[\alpha]_D^{20} + 24.2$. (ii) Cryst. from Et₂O. M.p. 139–40°. $[\alpha]_D^{20} - 31^\circ$.

β -Form.

Has not been obtained in cryst. state.

Phenylosazone: cryst. M.p. 210°.

p-Nitrophenylhydrazone: cryst. from H₂O. M.p. 198°.

l-.

Amorphous.

Phenylhydrazone: cryst. M.p. 196°.

dl-.

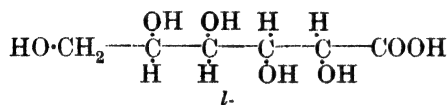
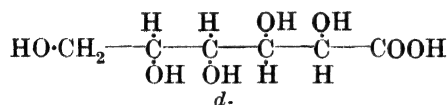
Syrup. Very sol. H₂O. Spar. sol. EtOH.

Phenylhydrazone: cryst. M.p. 175–7° decomp.

Hudson, Monroe, *J. Am. Chem. Soc.*, 1924, 46, 979.

See also first two references above.

Mannonic Acid



C₆H₁₂O₇

MW, 196

d-.

Not known in free state. Heating aq. sol. at 20° for a long period \rightarrow δ -lactone. Heating for 4 hours at 100° \rightarrow γ -lactone.

Na salt: cryst. $[\alpha]_D^{20} - 8.82^\circ$.

Ca salt: needles + 2H₂O from H₂O. M.p. 165°. $[\alpha]_D^{20} - 7.52^\circ$ in H₂O.

Quinine salt: needles from EtOH. M.p. 165°. $[\alpha]_D^{20} - 102^\circ$ in H₂O.

Brucine salt: needles from H₂O. M.p. 212°. $[\alpha]_D^{20} - 26.73^\circ$ in H₂O.

Et ester: C₈H₁₆O₇. MW, 224. Needles from EtOH. M.p. 164°. Optically inactive.

Amide: C₆H₁₃O₆N. MW, 195. Cryst. from EtOH.Aq. M.p. 176°. $[\alpha]_D^{15} - 17.2^\circ$ in H₂O. *N*-Me: needles. M.p. 165.5°. $[\alpha]_D^{15} - 18.1^\circ$.

Anilide: C₁₂H₁₇O₆N. MW, 271. Cryst. M.p. 176°. $[\alpha]_D^{15} - 16.9^\circ$ in H₂O.

m-Toluidide: C₁₃H₁₉O₆N. MW, 285. Cryst. M.p. 142°. $[\alpha]_D^{10} - 51.5^\circ$.

p-Toluidide: cryst. M.p. 169°. $[\alpha]_D^{10} - 18.1^\circ$.

Benzylamide: cryst. M.p. 164°. $[\alpha]_D^{15} - 9.1^\circ$.

β -Phenylethylamide: C₁₄H₂₁O₆N. MW, 299. Cryst. M.p. 166°. $[\alpha]_D^{15} - 7.5^\circ$.

Hydrazide: C₆H₁₄O₆N₂. MW, 210. Plates. M.p. 161° decomp. $[\alpha]_D^{15} - 2.7^\circ$ in H₂O, -38.8° in Py.

Benzylidene deriv.: cryst. M.p. 194° decomp. $[\alpha]_D^{15} - 8.0^\circ$ in Py.

Nitrile: C₆H₁₁O₄N. MW, 161. *Penta-acetyl*: cryst. from EtOH. M.p. 94°. $[\alpha]_D^{20} - 1.8^\circ$.

2:3:4:5-Tetra-Me ether: C₁₀H₂₀O₇. MW, 252. B.p. 180–2°/12 mm. $[\alpha]_D^{20} + 10.1^\circ$ in MeOH.

1:2:3:4:5-Penta-Me ether: C₁₁H₂₂O₇. MW, 266. Syrup. B.p. 110°/0.18 mm. $n_D^{20} 1.4409$. $[\alpha]_D^{20} + 13.3^\circ$ in EtOH.

γ -Lactone: C₆H₁₀O₆. MW, 178. Needles from EtOH. M.p. 151°. $[\alpha]_D^{20} + 51.8^\circ$ in H₂O. Very sol. H₂O. Spar. sol. EtOH. HNO₃ \rightarrow *d*-mannosaccharic acid. NaHg \rightarrow *d*-mannose. Quinoline + H₂O at 140° \rightarrow in part *d*-gluconic acid. *Tetra-acetyl*: cryst. M.p. 119°. $[\alpha]_D^{20} + 52^\circ$. *Tetra-Me ether*: cryst. M.p. 107°. $[\alpha]_D + 66.6^\circ$.

δ -Lactone: *2:3:4:6-Tetra-Me ether*: needles. M.p. 23–5°. B.p. 104°/0.02 mm. $n_D^{16} 1.4650^\circ$. $[\alpha]_D^{18} + 150^\circ$ initial, 63° final. *Phenylhydrazide*: plates from C₆H₆. M.p. 184–5°. $[\alpha]_D^{10} - 22^\circ$.

l-.

Not known in free state. Passes readily into the lactone.

Na salt: cryst. $[\alpha]_D + 10.1^\circ$.

Amide: needles from EtOH.Aq. M.p. 171–2°. $[\alpha]_D^{15} + 29.9^\circ$ in H₂O. NaOCl \rightarrow *l*-arabiose.

Hydrazide: plates from EtOH.Aq. M.p. 161–2° decomp. $[\alpha]_D^{14} + 4.4^\circ$ in H₂O. *Benzylidene*: cryst. M.p. 194–5° decomp.

γ -Lactone: needles. M.p. 150.5–151°. $[\alpha]_D - 51.8^\circ$ in H₂O. Very sol. H₂O. Spar. sol. EtOH. HNO₃ \rightarrow *l*-mannose. *Tetra-Me ether*: plates. M.p. 109°. $[\alpha]_D^{20} - 65.5^\circ$ initial, -47.4° final. *Tetra-acetyl*: cryst. M.p. 119°. $[\alpha]_D^{20} - 52^\circ$.

δ -Lactone: *3:4:6-Tri-Me ether*: prisms from Et₂O. M.p. 96–7°. $[\alpha]_D - 167^\circ$ initial, -112.8° final. *Phenylhydrazide*: cryst. from C₆H₆. M.p. 137–9°. *2:3:4:6-Tetra-Me ether*: low melting solid. B.p. 145–50°/0.06 mm. $[\alpha]_D^{15} - 150^\circ$ initial, -58.2° final. *Phenylhydrazide*: needles. M.p. 183–4°. $[\alpha]_D^{18} + 22^\circ$.

dl-.

Not known in free state.

Ca salt: needles. Sol. 60–70 parts boiling H₂O.

γ-Lactone: prisms from H_2O . M.p. 155° after sintering at 149° . $\text{NaHg} \rightarrow dl\text{-mannose}$.

Weerman, *Rec. trav. chim.*, 1917, **37**, 63.

Haworth, Nicholson, *J. Chem. Soc.*, 1926, 1899.

Drew, Goodyear, Haworth, *J. Chem. Soc.*, 1927, 1237.

Haworth, Peat, *J. Chem. Soc.*, 1929, 350.

Upson, Sands, Whitnah, *J. Am. Chem. Soc.*, 1928, **50**, 519.

Nelson, Cretcher, *J. Am. Chem. Soc.*, 1930, **52**, 403.

Wolfrom, Thompson, *J. Am. Chem. Soc.*, 1931, **53**, 622.

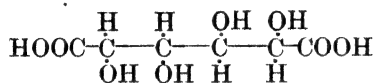
Brackenbury, Upson, *J. Am. Chem. Soc.*, 1933, **55**, 2512.

Fischer, *Ber.*, 1890, **23**, 390.

Irvine, Paterson, *J. Chem. Soc.*, 1914, **105**, 913.

Van Wijk, *Rec. trav. chim.*, 1921, **40**, 232.

Mannosaccharic Acid



$\text{C}_6\text{H}_{10}\text{O}_8$

MW, 210

d-.

Cryst. M.p. 128.5° . Does not reduce Fehling's. Passes slowly into dilactone.

Monolactone: *phenylhydrazide*, needles from H_2O . M.p. $190-1^\circ$ decomp. Sol. hot H_2O . Spar. sol. EtOH.

Dilactone: needles from EtOH or H_2O . M.p. $180-90^\circ$ decomp. $[\alpha]_D^{25} + 201.8^\circ$ in H_2O . Reduces warm Fehling's. $\text{NaHg} \rightarrow d\text{-mannonic acid}$.

Diamide: $\text{C}_6\text{H}_{12}\text{O}_6\text{N}_2$. MW, 208. Cryst. M.p. $188-189.5^\circ$ decomp. $[\alpha]_D^{20} - 24.4^\circ$.

l-.

Metasaccharic acid. Free acid not isolated.

Monolactone: *phenylhydrazide*, cryst. + $\frac{1}{2}\text{H}_2\text{O}$ from H_2O . M.p. $190-2^\circ$ decomp. Sol. hot H_2O , EtOH.

Dilactone: needles + $2\text{H}_2\text{O}$. M.p. 68° , anhyd. 180° decomp. Sol. hot H_2O . Spar. sol. EtOH. Insol. Et_2O . Aq. sol. reacts neutral, but becomes acid on standing. Reduces alk. Cu sols. *Diacetyl*: prisms from AcOH. M.p. 155° .

Diamide: leaflets. M.p. $189-90^\circ$ decomp.

dl-.

Not isolated in free state.

Monolactone: *phenylhydrazide*, cryst. M.p. $190-5^\circ$ decomp. Sol. hot H_2O .

Dilactone: prisms from H_2O . M.p. 190° decomp. Very sol. hot H_2O .

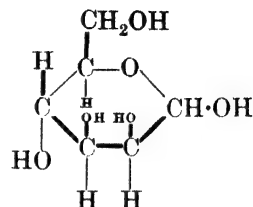
Diamide: leaflets. M.p. $183-5^\circ$ decomp.

Kiliani, *Ber.*, 1887, **20**, 341; 1926, **59**, 1473.

Fischer, *Ber.*, 1891, **24**, 539.

Rehorst, *Ber.*, 1932, **65**, 1476.

Mannose



$\text{C}_6\text{H}_{12}\text{O}_6$

MW, 180

d-. Semiose, carubiose.

Rhomboheda or prisms from EtOH.Aq. M.p. 132° . Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O . Sweet taste. $[\alpha]_D^{20} - 17.0^\circ \rightarrow +14.6^\circ$ in H_2O . Reduces Fehling's. Fermented by yeast. Gives same osazone as *d*-glucose and *d*-fructose.

1-Me ether: α -methylmannoside. $\text{C}_7\text{H}_{14}\text{O}_6$. MW, 194. Cryst. from MeOH. M.p. $189-91^\circ$. $[\alpha]_D^{20} + 79.3^\circ$ in H_2O . *Tetra-acetyl*: m.p. $104-5^\circ$. $[\alpha]_D^{27} - 22.6^\circ$ in CHCl_3 .

4-Me ether: $\text{C}_7\text{H}_{14}\text{O}_6$. MW, 194. Syrup. $[\alpha]_D^{20} + 7.38^\circ$ in H_2O . Sweet taste. *Phenylhydrazone*: m.p. 179° . *Osazone*: decomp. at 198° . $[\alpha]_D^{20} - 35.12^\circ$.

Tetra-Me ether: $\text{C}_{10}\text{H}_{20}\text{O}_6$. MW, 236. Syrup. B.p. $187-9^\circ/19$ mm.

1:2:3:4-Tetra-acetyl: cryst. from AcOH. M.p. $133.5-136.5^\circ$. $[\alpha]_D^{20} - 22.5^\circ$ in CHCl_3 . $[\alpha]_D^{20} - 15^\circ$ to -13° in H_2O .

2:3:4:6-Tetra-acetyl: m.p. 93° . $[\alpha]_D^{27} + 26.3^\circ$ in CHCl_3 . Easily reduces hot Fehling's.

Penta-acetyl: α -form, m.p. 74° . $[\alpha]_D^{28} + 56.6^\circ$ in CHCl_3 . β -Form, m.p. 117° . $[\alpha]_D^{21} - 24.1^\circ$ in CHCl_3 .

1-Bromotetra-acetyl: m.p. $53-4^\circ$. $[\alpha]_D^{28} + 123.2^\circ$ in CHCl_3 .

Diacetone deriv.: needles from pet. ether. M.p. 118° . Sol. H_2O , Et_2O , C_6H_6 . Does not reduce Fehling's.

Pentanitate: needles from EtOH. M.p. $81-2^\circ$. $[\alpha]_D^{20} + 93.3^\circ$ in EtOH.Aq.

Oxime: cryst. M.p. $176-84^\circ$. Very sol. hot, spar. sol. cold H_2O . Insol. EtOH. $[\alpha]_D + 3.1^\circ$ in H_2O .

Phenylhydrazone: m.p. $199-200^\circ$. $[\alpha]_D + 27.3^\circ$ to $+28.6^\circ$ in EtOH-Py.

p-Tolylhydrazone: cryst. from EtOH. M.p. $190-1^\circ$.

o-Nitrophenylhydrazone: m.p. $172-3^\circ$. $[\alpha]_D + 52^\circ$ in EtOH-Py.

m-Nitrophenylhydrazone: m.p. 162–3°. $[\alpha]_D + 26.5^\circ$ to -8.3° in EtOH-Py.

p-Nitrophenylhydrazone: m.p. 202–3°. $[\alpha]_D + 56^\circ$ in EtOH-Py.

Phenylosazone: see under *d*-Fructose.

l-

Cryst. from EtOH. M.p. 132°. $[\alpha]_D + 14^\circ$ to -14° . Very sol. H₂O. Mod. sol. MeOH. Spar. sol. EtOH.

Phenylhydrazone: m.p. 195°.

Phenylosazone: see under *l*-Fructose.

dl-

Cryst. M.p. 132–3°. Sol. EtOH.Aq. Sweet taste when pure.

Phenylosazone: osazone of α -acrose. See under α -Acrose.

Haworth, Hirst, *J. Chem. Soc.*, 1928, 1221.

Helferich, Leete, *Ber.*, 1929, 62, 1549.

Pacsu, Kary, *Ber.*, 1929, 62, 2811.

Butler, Cretcher, *J. Am. Chem. Soc.*, 1931, 53, 4358, 4363.

Clark, *J. Biol. Chem.*, 1922, 51, 1.

Rüber, Minsaas, *Ber.*, 1927, 60, 2411.

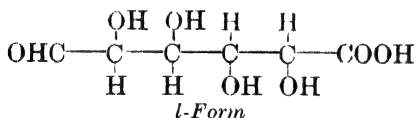
Levene, *J. Biol. Chem.*, 1935, 108, 419.

Hudson, *Organic Syntheses*, Collective Vol. I, 362.

Mannosone.

See Glucosone.

Mannuronic Acid



C₆H₁₀O₇

MW, 194

l-

Lactone: C₆H₈O₆. MW, 176. M.p. 143–4° decomp. $[\alpha]_D^{27} - 92.0^\circ$ in H₂O.

Semicarbazone: m.p. 189°.

d-

α -Form.

Needles from EtOH-Et₂O. Decomp. at 120–30°. Very hygroscopic. $[\alpha]_D^{25} + 16.01^\circ$ to -6.05° in H₂O.

Lactone: m.p. 143–4°. $[\alpha]_D^{20} + 95^\circ$ in H₂O.

β -Form.

Cryst. + $\frac{1}{2}$ H₂O from H₂O-Me₂CO-Et₂O. M.p. 165–7°. $[\alpha]_D^{25} - 47.9^\circ$ to -23.94° in H₂O. At 60° \rightarrow lactone.

Lactone: m.p. 140–1°. $[\alpha]_D^{25} + 89.8^\circ$ in H₂O.

Cinchonine salt: m.p. 154° decomp.

Cinchonidine salt: m.p. 154° decomp.

Brucine salt: m.p. 147° decomp.

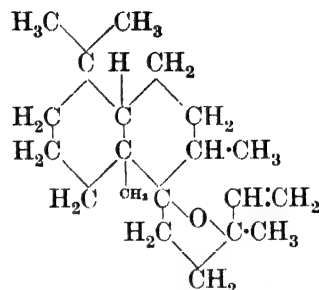
Niemann, Link, *J. Biol. Chem.*, 1933, 100, 407.

Nelson, Cretcher, *J. Am. Chem. Soc.*, 1932, 54, 3409.

Niemann, McCubbin, Link, *J. Biol. Chem.*, 1934, 104, 737.

Ault, Haworth, Hirst, *J. Chem. Soc.*, 1935, 517.

Manoyl oxide



Suggested structure

C₂₀H₃₄O

MW, 290

Constituent of terpenes of *Dacrydium Colensoi*. Cryst. from MeOH.Aq. or Me₂CO.Aq. M.p. 29°. B.p. 135–7°/0.3 mm. $[\alpha]_D^{18} + 19.6^\circ$ in EtOH. Very sol. most org. solvents. Spar. sol. pet. ether.

Hosking, Brandt, *Ber.*, 1934, 67, 1175; 1935, 68, 37.

Margaric Acid.

See Heptadecylic Acid. “Natural” margaric acid (Daturic Acid) is not a pure compound. The following data are given:

M.p. 60°.

Me ester: needles. M.p. 30° (26°). B.p. 184°/9 mm. Sol. EtOH, Et₂O, CHCl₃, pet. ether.

Amide: needles from dil. EtOH. M.p. 103°. Spar. sol. Et₂O, pet. ether.

Holde, *Ber.*, 1905, 38, 1247.

Lipps, Kovács, *J. prakt. Chem.*, 1919, [2], 99, 243.

Meyer, Beer, *Monatsh.*, 1912, 33, 319.

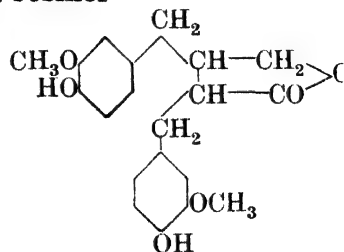
Margaric Aldehyde.

See Heptadecyl Aldehyde.

Marsh Gas.

See Methane.

Matai-resinol



C₂₀H₂₂O₆

MW, 358

Constituent of exudation of *Podocarpus Spicatus*. Needles + $\text{IC}_2\text{H}_5\text{OH}$ from EtOH . M.p. $77-8^\circ$, anhyd. m.p. 119° . $[\alpha]_D^{15} - 4.89^\circ$. Very sol. Me_2CO . Sol. EtOH , MeOH , AcOEt , CHCl_3 . Spar. sol. Et_2O , C_6H_6 , toluene. Insol. pet. ether.

Acetyl deriv.: needles from EtOH.Aq . M.p. 110° .

Dibenzoyl deriv.: cryst. from EtOH . M.p. 133° .

Easterfield, Bee, *J. Chem. Soc.*, 1910, **97**, 1029.

Haworth, Richardson, *J. Chem. Soc.*, 1935, 634.

Matezite.

See under Inositol.

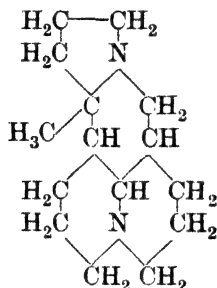
Matezodambose.

See under Inositol.

Matricaria Camphor.

See l-Camphor.

Matridine



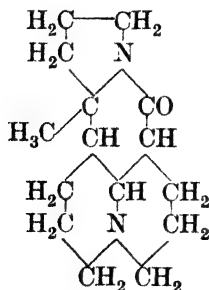
$\text{C}_{15}\text{H}_{26}\text{N}_2$ MW, 234

Needles from pet. ether. M.p. 76° . Sol. cold H_2O . Sublimes.

$B, H\text{AuCl}_4$: m.p. 216° .

Kondo, Sato, *Chem. Abstracts*, 1922, **16**, 2107.

Matrine



$\text{C}_{15}\text{H}_{24}\text{ON}_2$ MW, 248

Alkaloid from *Sophora flavescens*. Isomeric with lupanine. Four forms.

α : needles or plates. M.p. 76° .

β : prisms. M.p. 87° . $[\alpha]_D^{10} - 28.73^\circ$.

γ : b.p. $223^\circ/6\text{ mm}$. $D_4^{25} 1.088$. $n_D^{25} 1.52865$.

δ : prisms. M.p. 84° .

Sol. cold H_2O , CHCl_3 , C_6H_6 , CS_2 . Spar. sol. Et_2O , pet. ether. Zn dust dist. \rightarrow matridine.

Red. \rightarrow deoxymatrine. HI \rightarrow dimatrine.

$B, H\text{AuCl}_4$: m.p. 199° .

$B_2, H_2\text{PtCl}_6$: m.p. 249° decomp.

Methiodide: m.p. 211° .

Winterfeld, Kneuer, *Ber.*, 1931, **64**, 150.

Kondo, *Arch. Pharm.*, 1928, **266**, 1.

α -Matrinidine

$\text{C}_{12}\text{H}_{20}\text{N}_2$ MW, 192

Yellow oil. B.p. 282° decomp. $D_4^{15} 1.025$. $n_D 1.5283$. $[\alpha]_D^{18} - 18.75^\circ$.

Acetyl deriv.: m.p. 160° .

Benzoyl deriv.: m.p. 153° .

$B, H_2\text{PtCl}_6$: m.p. 289° decomp.

Picrate: needles. M.p. 228° .

Kondo, Ochiai, *Chem. Zentr.*, 1926, **I**, 410; 1927, **I**, 1481.

Kondo, Ochiai, Nakamura, *Chem. Abstracts*, 1929, **23**, 2437.

β -Matrinidine

$\text{C}_{13}\text{H}_{20}\text{N}_2$ MW, 204

Yellow oil. B.p. $174-6^\circ/0.6\text{ mm}$. $[\alpha]_D^{18} + 1.68^\circ$. $D_4^{16} 1.0836$. $n_D^{20} 1.56208$.

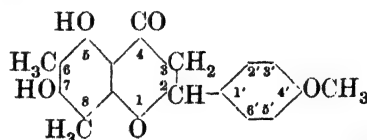
$B, H\text{AuCl}_4$: m.p. 106° .

$B_2, H_2\text{PtCl}_6$: m.p. 214° .

Picrate: m.p. 184° .

See first reference above.

Matteucinol (5 : 7-Dihydroxy-4'-methoxy-6 : 8-dimethylflavanone)



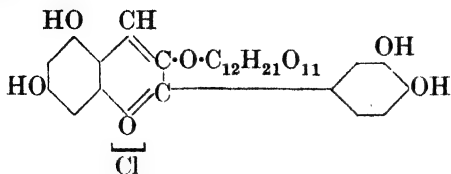
$\text{C}_{16}\text{H}_{18}\text{O}_4$ MW, 274

Occurs in leaves and stems of *Matteucia orientalis*. Yellow needles from MeOH . M.p. 174° . Conc. $\text{H}_2\text{SO}_4 \rightarrow$ brown col. $\text{FeCl}_3 \rightarrow$ indigo-blue col. Sol. most solvents and alkalis. Insol. H_2O , acids.

Munesada, *Chem. Abstracts*, 1924, **18**, 1847.

Fujise, *Chem. Abstracts*, 1930, **24**, 3238.

Mecocyanin chloride (*Cyanidin-3-gentio-bioside*)



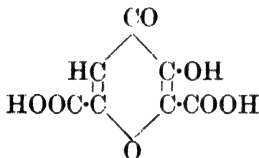
$C_{27}H_{31}O_{16}Cl$

MW, 646.5

Dark red needles with green reflex from 2% alc. HCl. Very sol. H_2O . Spar. sol. EtOH. Insol. Me_2CO . Hyd. \rightarrow chrysanthemin \rightarrow cyanidin.

Grove, Inubuse, Robinson, *J. Chem. Soc.*, 1934, 1608 (*Bibl.*).

Meconic Acid (3-Hydroxy- γ -pyrone-2 : 6-dicarboxylic acid)



$C_7H_4O_7$

MW, 200

Cryst. + $3H_2O$ from H_2O . Loses the $3H_2O$ at 100° . Sol. 4 parts boiling H_2O ; 50 parts MeOH, AcOEt; 100 parts Me_2CO . Sol. EtOH, C_6H_6 . Spar. sol. amyl alcohol ligroin, CS_2 , glycerol. Boiling $H_2O \rightarrow$ comenic acid. $FeCl_3 \rightarrow$ blood red col.

Mono-Me ester : $C_8H_6O_7$. MW, 214. Cryst. M.p. 161° .

Di-Me ester : $C_9H_8O_7$. MW, 228. Cryst. from MeOH. M.p. 117° .

Mono-Et ester : $C_9H_8O_7$. MW, 228. Needles from H_2O . M.p. 179° .

Di-Et ester : $C_{11}H_{12}O_7$. MW, 256. Plates from H_2O . M.p. 111.5° .

Mono-propyl ester : $C_{10}H_{10}O_7$. MW, 242. Cryst. from H_2O . M.p. 165° .

Dipropyl ester : $C_{13}H_{16}O_7$. MW, 284. Cryst. M.p. 105° .

Di-isobutyl ester : $C_{15}H_{20}O_7$. MW, 312. Cryst. M.p. 98° .

Monoamide : $C_7H_5O_6N$. MW, 199. Cryst. from H_2O . M.p. 65° .

Diamide : $C_7H_6O_5N_2$. MW, 198. Grey powder.

Acetyl : needles from H_2O . M.p. 218° .

Benzoyl : leaflets. M.p. 248° .

Urethane : cryst. M.p. 124° .

Et ether : $C_9H_8O_7$. MW, 228. Prisms + $1H_2O$

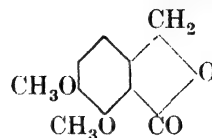
from H_2O . M.p. 200° . *Di-Et ester* : prisms from EtOH. M.p. 61° .

Valenti, *Chem. Zentr.*, 1905, II, 491.

Lautenschlager, *Biochem. Z.*, 1919, **96**, 73.

Mennel, *J. prakt. Chem.*, 1882, **26**, 456.

Meconine (5 : 6-Dimethoxyphthalide)



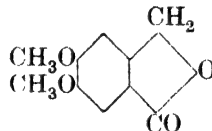
$C_{10}H_{10}O_4$

MW, 194

Needles from H_2O . M.p. 102.5° . Sol. EtOH, Et_2O . Sol. 700 parts H_2O at 15.5° , 22 parts at 100° . Sublimes.

Edwards, Perkin, Stoye, *J. Chem. Soc.*, 1925, **127**, 195.

m-Meconine (4 : 5-Dimethoxyphthalide)



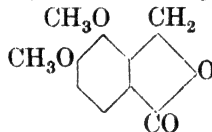
$C_{10}H_{10}O_4$

MW, 194

Cryst. from EtOH.Aq. M.p. $155-7^\circ$.

See previous reference.

ψ -**Meconine** (3 : 4-Dimethoxyphthalide)



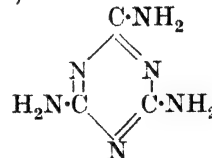
$C_{10}H_{10}O_4$

MW, 194

Needles from H_2O . M.p. $123-4^\circ$. Very sol. EtOH. Et_2O , C_6H_6 . Spar. sol. H_2O .

Edwards, Perkin, Stoye, *J. Chem. Soc.*, 1925, **127**, 195.

Melamine (*Cyanuramide, cyanuric triamide, triaminotriazine*)



$C_3H_6N_6$

MW, 126

Prisms. Sol. hot H_2O . Spar. sol. cold H_2O , hot EtOH. Sublimes when carefully heated. Decomp. on strong heating.

B.HCl : needles. Insol. EtOH.

$(B,HCl)_2, PtCl_4$: prisms.

$(B)_2, H_2SO_4$: needles. Spar. sol. H_2O .

$B_2H_2SO_4$: prisms. $H_2O \rightarrow$ neutral salt.

Franklin, *J. Am. Chem. Soc.*, 1922, **44**, 504.

Barnett, *J. Phys. Chem.*, 1930, **34**, 1497.

Melampyrin.

See Dulcitol.

Melanuric Acid.

See Ammelide.

Melene

$C_{30}H_{60}$

MW, 420

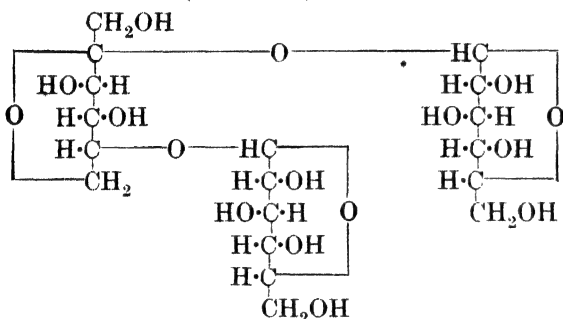
Occurs in coal tar. Cryst. from petrol. M.p. $62-3^\circ$. D_{25}^{25} 0.9037, D_D^{25} 0.7913. n_D^{20} 1.4228.

Marcusson, Böttger, *Ber.*, 1924, **57**, 633.

Meletin.

See Quercitin.

Melezitose (Melizitose)



$C_{18}H_{32}O_{16}$

MW, 504

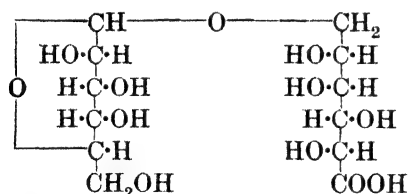
Cryst. M.p. $153-4^\circ$. $[\alpha]_D^{20} + 88.2^\circ$ in H_2O , $[\alpha]_D^{25} + 88.7^\circ$ in H_2O . Hyd. \rightarrow turanose + glucose.

Hendecamethyl ether: $C_{29}H_{54}O_6$. MW, 658. B.p. $236^\circ/0.01$ mm. n_D 1.4680. $[\alpha]_D + 114^\circ$ in MeOH.

Leitch, *J. Chem. Soc.*, 1927, 588.

Pacsu, *J. Am. Chem. Soc.*, 1931, **53**, 3099.

Melibionic Acid



$C_{12}H_{22}O_{12}$

MW, 358

Free acid not isolated.

Ca salt: white powder + 2-3EtOH. Does not reduce Fehling's.

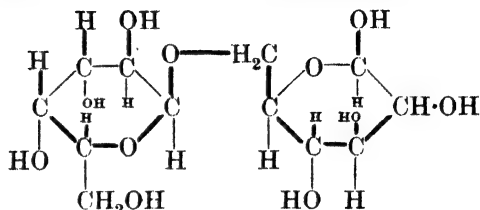
Octa-Me ether: $C_{20}H_{38}O_{12}$. MW, 470. Me ester: $C_{21}H_{40}O_{12}$. MW, 484. Oil. B.p. $173-5^\circ/0.06$ mm. n_D^{14} 1.4640. $[\alpha]_D^{15} + 106.4^\circ$ in H_2O .

Nitrile: $C_{12}H_{21}O_{10}N$. MW, 339. Octa-acetyl: powder from H_2O .

Haworth, Loach, Long, *J. Chem. Soc.*, 1927, 3146.

Zemplén, *Ber.*, 1927, **60**, 928.

Melibiose (Glucose-6- α -galactoside)



$C_{12}H_{22}O_{11}$

MW, 342

Cryst. M.p. 85° . $[\alpha]_D^{20} + 110.5^\circ$ in H_2O initially, $+127^\circ$ on standing. Dil. min. acids \rightarrow glucose + galactose.

Oxime: needles. M.p. 186° decomp. Sol. H_2O . Spar. sol. EtOH, MeOH. Less sol. other org. solvents.

Phenylhydrazone: cryst. M.p. 145° . Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O , $CHCl_3$, C_6H_6 .

Allylphenylhydrazone: m.p. 197° . $[\alpha]_D + 21.2^\circ$ in MeOH.

Phenylosazone: yellow needles from toluene. M.p. $178-9^\circ$. $[\alpha]_D^{21} + 43.15^\circ$ in Py. Very sol. EtOH, Me_2CO , Py. Less sol. $CHCl_3$, toluene. Spar. sol. H_2O .

p-Bromophenylosazone: yellow needles from EtOH. M.p. 182° .

β -Methyl ether: methyl- β -melibioside. $C_{13}H_{24}O_{11}$. MW, 356. Amorph. $[\alpha]_D^{27} + 75.0^\circ$ in H_2O . Hepta-Me ether: $C_{20}H_{38}O_{11}$. MW, 454. Needles from pet. ether. M.p. $106-7^\circ$. B.p. $163^\circ/0.015$ mm. $[\alpha]_D + 97.8^\circ$ in H_2O . n_D^{20} 1.4662. Hepta-acetyl: cryst. from EtOH. M.p. 150° . $[\alpha]_D^{23} + 90.5^\circ$ in $CHCl_3$.

Octa-acetyl: α -form, $[\alpha]_D + 147.3^\circ$ in Ac_2O . β -Form: cryst. from EtOH. M.p. 177.5° . $[\alpha]_D^{20} + 102.5^\circ$ in $CHCl_3$. Sol. hot EtOH, $CHCl_3$, C_6H_6 , AcOH. Mod. sol. Et_2O . Spar. sol. ligroin, CS_2 . Insol. cold H_2O .

Fluorohepta-acetyl: m.p. 135° . $[\alpha]_D^{20} + 149.7^\circ$.

Chlorohepta-acetyl: m.p. 127° . $[\alpha]_D^{20} + 192.5^\circ$.

Bromohepta-acetyl: m.p. 116° . $[\alpha]_D^{20} + 209.9^\circ$.

Hudson, Harding, *J. Am. Chem. Soc.*, 1915, **37**, 2734.

Haworth, Loach, Long, *J. Chem. Soc.*, 1927, 3146.

Scheibler, Mittelmeier, *Ber.*, 1890, **23**, 1438.

Pictet, Vogel, *Helv. Chim. Acta*, 1926, **9**, 806.

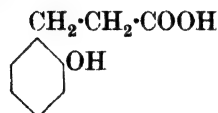
Zemplén, *Ber.*, 1927, **60**, 923.

Helferich, Bredereck, *Ann.*, 1928, **465**, 170.

Brauns, *J. Am. Chem. Soc.*, 1929, **51**, 1820.

Harding, *Sugar*, 1923, **25**, 514 (*Bibl.*).

Melilotic Acid (2-Hydroxyhydrocinnamic acid, o-hydroxy-2-phenylpropionic acid, o-hydrocoumaric acid)



$\text{C}_9\text{H}_{10}\text{O}_3$ MW, 166

Cryst. from H_2O . M.p. $82-3^\circ$. Very sol. EtOH, Et₂O. Sol. 20 parts H_2O at 18° . $\text{FeCl}_3 \rightarrow$ blue col. Dist. \rightarrow lactone.

Et ester: $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. Prisms from Et₂O. M.p. 34° . Very sol. EtOH, Et₂O. Insol. H_2O .

Amide: $\text{C}_9\text{H}_{11}\text{O}_2\text{N}$. MW, 165. Needles. M.p. 70° . Very sol. hot H_2O , EtOH, Et₂O. Acetyl: cryst. from C_6H_6 or H_2O . M.p. $68-70^\circ$.

Nitrile: $\text{C}_9\text{H}_9\text{ON}$. MW, 147. B.p. $147-9^\circ/1$ mm. Acetyl: cryst. M.p. $60-1^\circ$. m-Nitrobenzoyl: cryst. from AcOH. M.p. $164-5^\circ$.

Lactone: see Hydrocoumarin.

Hydrazide: needles from H_2O . M.p. $164-5^\circ$. Very sol. EtOH, AcOH. Spar. sol. H_2O , Et₂O, Me_2CO , CHCl_3 .

Me ether: see o-Methoxyhydrocinnamic Acid.

Et ether: o-ethoxyhydrocinnamic acid. $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. Needles from H_2O . M.p. $80-1^\circ$. Very sol. EtOH, Et₂O. Sol. hot H_2O .

Propyl ether: $\text{C}_{12}\text{H}_{16}\text{O}_3$. MW, 208. Cryst. from ligroin. M.p. 63° .

Houben, Pfankuch, *Ber.*, 1926, **59**, 1599.

Auwers, *Ann.*, 1918, **415**, 159.

Stoermer, *Ber.*, 1911, **44**, 647.

Fittig, Ebert, *Ann.*, 1883, **216**, 153.

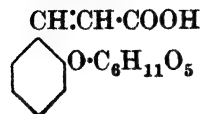
Pschorr, Einbeck, *Ber.*, 1905, **38**, 2069.

Schroeter, D.R.P., 562,827, (*Chem. Abstracts*, 1933, **27**, 1224).

Melilotol.

See Hydrocoumarin.

Melilotoside (Glucosido-o-coumaric acid)



$\text{C}_{15}\text{H}_{18}\text{O}_8$

Dict. of Org. Comp.—II.

MW, 326

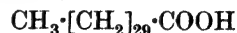
Glucoside of *Melilotus altissima*, Thuil, and *Melilotus arvensis*, Wallr. Needles from H_2O . M.p. $240-1^\circ$ decomp. $[\alpha]_D -60.9^\circ$ in 50% EtOH. Very sol. hot H_2O . Sol. EtOH. Spar. sol. cold H_2O , Me_2CO , AcOEt. Hyd. by dil. acids or emulsin.

Shinoda, Imaida, *Chem. Zentr.*, 1934, II, 3388.

Melissane.

See Isotriacontane.

Melissic Acid (Triacontane-1-carboxylic acid)



$\text{C}_{31}\text{H}_{62}\text{O}_2$ MW, 466

Occurs in beeswax. Cryst. from C_6H_6 . M.p. 90° . Sol. hot EtOH, C_6H_6 . Spar. sol. MeOH, Et₂O.

Me ester: $\text{C}_{32}\text{H}_{64}\text{O}_2$. MW, 480. Needles from ligroin. M.p. 74.5° ($71-71.5^\circ$). Sol. EtOH, Et₂O, pet. ether.

Et ester: $\text{C}_{33}\text{H}_{66}\text{O}_2$. MW, 494. Needles from EtOH. M.p. 73.5° ($69.5-70^\circ$).

Melissyl ester: $\text{C}_{64}\text{H}_{124}\text{O}_2$. MW, 924. Cryst. from C_6H_6 or CHCl_3 . M.p. 90.5° .

Chloride: $\text{C}_{31}\text{H}_{61}\text{OCl}$. MW, 484.5. M.p. 60° .

Amide: $\text{C}_{31}\text{H}_{63}\text{ON}$. MW, 465. M.p. 116° .

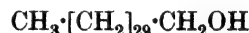
Nitrile: $\text{C}_{31}\text{H}_{61}\text{N}$. MW, 447. M.p. 70° . Very sol. C_6H_6 .

Gascard, *Ann. chim.*, 1921, **15**, 350.

Marie, *Ann. chim. phys.*, 1896, **7**, 211.

Schwalb, *Ann.*, 1886, **235**, 126.

Melissyl Alcohol (Myricyl alcohol, hentriacontanol-1)



$\text{C}_{31}\text{H}_{64}\text{O}$ MW, 452

Cryst. from C_6H_6 . M.p. 87° . Sol. most org. solvents. Present as palmitate in beeswax.

Acetyl: cryst. from Et₂O. M.p. 70° .

Phenylurethane: m.p. 96° .

See first reference above and also

Heiduschka, Gareis, *J. prakt. Chem.*, 1919, **99**, 308.

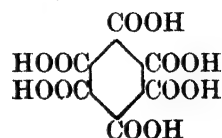
Melizitose.

See Melezitose.

Mellithene.

See Hexamethylbenzene.

Mellitic Acid (Benzene-hexacarboxylic acid)



$\text{C}_{12}\text{H}_6\text{O}_{12}$

MW, 342

35

Occurs in many coal and wood products. Needles from EtOH. M.p. 286–8° decomp. Sol. H₂O, EtOH. Heat of comb. C_p 790.8 Cal., C_p 788.2 Cal. Dist. \rightarrow pyromellitic acid dianhydride + CO₂. Heat with CaCO₃ \rightarrow C₆H₆ + CO₂. Heat with glycerol \rightarrow trimesic acid + CO₂. Very stable, sol. in boiling conc. H₂SO₄ unchanged. Aq. electrolysis \rightarrow CO₂ + H₂ + O₂ + CO.

Tetra-Me ester: C₁₆H₁₄O₁₂. MW, 398. M.p. 70–110°.

Penta-Me ester: C₁₇H₁₆O₁₂. MW, 412. Needles from H₂O. M.p. 141–4°.

Hexa-Me ester: C₁₈H₁₈O₁₂. MW, 426. Needles from EtOH.Aq. M.p. 187–8°. Heat of comb. C_p 1826.5 Cal., C_p 1825.6 Cal.

Hexa-Et ester: C₂₄H₃₀O₁₂. MW, 510. M.p. 72–3°.

Di-anhydride: C₁₂H₂O₁₀. MW, 306. Cryst. powder. Sol. H₂O \rightarrow mellitic acid. Heat \rightarrow pyromellitic dianhydride. Ac₂O \rightarrow trianhydride.

Trianhydride: C₁₂O₉. MW, 288. Cryst. from C₆H₅·COCl. M.p. 320° decomp. Hot H₂O \rightarrow mellitic acid. Spar. sol. most org. solvents. Sol. naphthalene and phenanthrene to red sols. Sol. PhNO₂ to bluish-green sol. AlCl₃ + C₆H₆ \rightarrow tribenzoylbenzenetricarboxylic acid.

Hexa-chloride: C₁₂O₆Cl₆. MW, 453. Prisms from Et₂O. M.p. 190°. Sublimes at 240°.

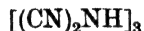
Meyer, Raudnitz, *Ber.*, 1930, **63**, 2010.

Phillipi, Rie, *Monatsh.*, 1921, **42**, 5.

v. Pechmann, *Ber.*, 1898, **31**, 502.

Meyer, Steiner, *Monatsh.*, 1914, **35**, 482.

Mellon



C₆H₃N₉ MW, 201

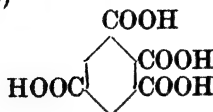
Bright yellow powder. Insol. H₂O, dil. acids and alkalis. Boiling KOH \rightarrow potassium mellon + NH₃. Further decomp. \rightarrow HCN + C₂N₂ + N₂. Heat at 500° in steam \rightarrow CO₂ + NH₃.

Glud, Keller, Klempt, *Z. angew. Chem.*, 1926, **39**, 1071.

Franklin, *J. Am. Chem. Soc.*, 1922, **44**, 506.

Liebig, *Ann.*, 1844, **50**, 342.

Mellophanic Acid (Benzene-1 : 2 : 3 : 5-tetracarboxylic acid)



C₁₀H₆O₈

MW, 254 C₁₀H₁₆

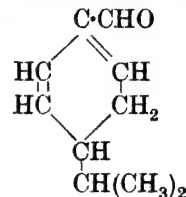
Prisms from HCl. M.p. 238–53°. Sol. H₂O, Et₂O.

Tetra-Me ester: C₁₄H₁₄O₈. MW, 310. Needles from MeOH. M.p. 107–9°.

Smith, Byrkit, *J. Am. Chem. Soc.*, 1933, **55**, 4305.

Bamford, Simonsen, *J. Chem. Soc.*, 1910, **97**, 1904.

$\Delta^{1,5}$ -*p*-Menthadienal ($\Delta^{1,5}$ -Dihydrocuminaldehyde, 4-isopropyl-1-aldehydo-1 : 5-cyclohexadiene)



C₁₀H₁₄O MW, 150

B.p. 136–40°/15 mm. D₄²⁰ 0.98. n_D²⁰ 1.528.

Ox. \rightarrow cuminic acid.

Oxime: m.p. 42–4°. B.p. 150°/12 mm.

Semicarbazone: needles from MeOH. M.p. 200°.

Phenylhydrazone: m.p. 123–6°.

Azine: cryst. from EtOH.Aq. M.p. 111–12°.

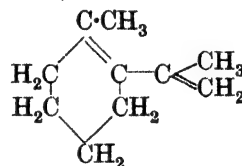
Francesconi, Sernagiotto, *Atti accad. Lincei*, 1911, ii, **20**, 326, 338.

Wallach, *Ann.*, 1905, **340**, 3.

$\Delta^{1,8(9)}$ -*p*-Menthadienal.

See Perillyl Aldehyde.

$\Delta^{1,8(9)}$ -*o*-Menthadiene (1-Methyl-2-isopropenylcyclohexene-1)



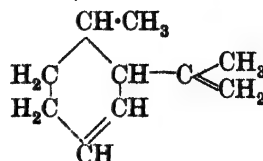
C₁₀H₁₆ MW, 136

Liq. with citron-like odour. M.p. –40°.

B.p. 177°. Na + EtOH \rightarrow $\Delta^{2,8}$ -*o*-menthene.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1076.

$\Delta^{3,8(9)}$ -*o*-Menthadiene (1-Methyl-2-isopropenylcyclohexene-3)



MW, 136

$\Delta^{4,8(9)}$ -o-Menthadiene

Exists in two forms.

"*Cis*":

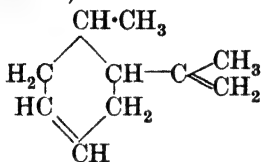
B.p. 169–70°. D_{20}^{20} 0.8507. n_D 1.4749.

"*Trans*":

B.p. 170°. D_{20}^{20} 0.8477. n_D 1.4749.

Perkin, *J. Chem. Soc.*, 1911, **99**, 753.

$\Delta^{4,8(9)}$ -o-Menthadiene (1-Methyl-2-isopropenylcyclohexene-4)



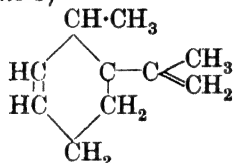
$C_{10}H_{16}$

MW, 136

Liq. with eucalyptus-like odour. B.p. 170–1°. Adds 4 Br. Ac_2O + 1 drop conc. $H_2SO_4 \rightarrow$ brown col.

Perkin, *J. Chem. Soc.*, 1911, **99**, 757.

$\Delta^{5,8(9)}$ -o-Menthadiene (1-Methyl-2-isopropenylcyclohexene-5)



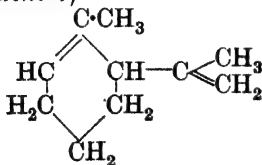
$C_{10}H_{16}$

MW, 136

B.p. 170–1°. D_{17}^{17} 0.8490. n_D 1.4778. Adds 4 Br.

Perkin, *J. Chem. Soc.*, 1911, **99**, 737.

$\Delta^{6,8(9)}$ -o-Menthadiene (1-Methyl-2-isopropenylcyclohexene-6)



$C_{10}H_{16}$

MW, 136

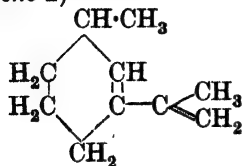
Liq. with eucalyptus-like odour. B.p. 170–1°. D_{20}^{20} 0.8481. n_D 1.4758.

Perkin, *J. Chem. Soc.*, 1911, **99**, 741.

$\Delta^{1,8(9)}$ -m-Menthadiene.

See Sylvestrene.

$\Delta^{2,8(9)}$ -m-Menthadiene (1-Methyl-3-isopropenylcyclohexene-2)



$C_{10}H_{16}$

MW, 136

d-.

B.p. 181°/736 mm. D_{17}^{17} 0.864. n_D 1.4946. $[\alpha]_D + 64^\circ$.

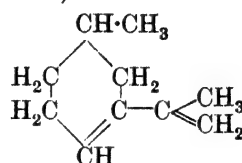
dl-.

Liq. with citron-like odour. B.p. 184–7°. D_{20}^{20} 0.8624. n_D 1.503. Adds 2 Br. Ac_2O + 1 drop conc. $H_2SO_4 \rightarrow$ violet col.

Perkin, Tattersall, *J. Chem. Soc.*, 1905, **87**, 1101.

Haworth, Perkin, Wallach, *J. Chem. Soc.*, 1911, **99**, 130.

$\Delta^{3,8(9)}$ -m-Menthadiene (1-Methyl-3-isopropenylcyclohexene-3)



$C_{10}H_{16}$

MW, 136

d-.

B.p. 179°/730 mm. n_D 1.4972. $[\alpha]_D + 17.5^\circ$.

l-.

B.p. 181–2°. $[\alpha]_D - 12.9^\circ$.

dl-.

Liq. with citron-like odour. B.p. 187°. D_{20}^{20} 0.8609. n_D 1.4975. Oxidises in air. Ac_2O + 1 drop conc. $H_2SO_4 \rightarrow$ reddish-violet col.

Luff, Perkin, *J. Chem. Soc.*, 1911, **99**, 526.

$\Delta^{6,8(9)}$ -m-Menthadiene.

See Isocarvestrene.

$\Delta^{1,3}$ -p-Menthadiene.

See α -Terpinene.

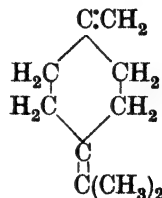
$\Delta^{1,4}$ -p-Menthadiene.

See γ -Terpinene.

$\Delta^{1,4(8)}$ -p-Menthadiene.

See Terpinolene.

$\Delta^{1(7),4(8)}$ -p-Menthadiene (*Crithmene*, 1-methylene-4-isopropylidene-cyclohexane)



$C_{10}H_{16}$

MW, 136

Constituent of fenchel oil. B.p. 178–80°. $HCl \rightarrow$ terpinene dihydrochloride.

Nitroschloride: cryst. from CHCl_3 -MeOH. M.p. 110–12°.

Nitrosite: m.p. 89–90°.

Nitrosate: m.p. 104–5° (109°).

Francesconi, Sernagiotto, *Gazz. chim. ital.*, 1913, 43, 66.

Délépine, de Belsunge, *Bull. soc. chim.*, 1918, 23, 34.

$\Delta^{1,5}$ -*p*-Menthadiene.

See α -Phellandrene.

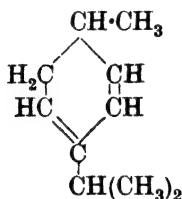
$\Delta^{1,8(9)}$ -*p*-Menthadiene.

See Limonene.

$\Delta^{2,1(7)}$ -*p*-Menthadiene.

See β -Phellandrene.

$\Delta^{2,4}$ -*p*-Menthadiene (1-Methyl-4-isopropylcyclohexadiene-2 : 4, moslene)



$\text{C}_{10}\text{H}_{16}$

MW, 136

B.p. 174–6°. D_{27}^{27} 0.8441. n_D^{27} 1.4845. Ox. \rightarrow succinic acid. Adds 4 Br. Sol. conc. H_2SO_4 to red sol.

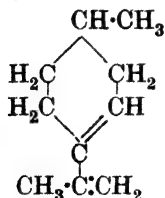
Harries, Majima, *Ber.*, 1908, 41, 2520.

Harries, *Ann.*, 1903, 328, 322.

$\Delta^{3,1(7)}$ -*p*-Menthadiene.

See β -Terpinene.

$\Delta^{3,8(9)}$ -*p*-Menthadiene (1-Methyl-4-isopropenylcyclohexene-3)



$\text{C}_{10}\text{H}_{16}$

MW, 136

d-.

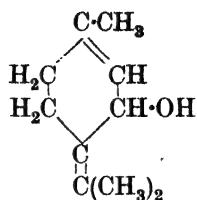
Liq. with limonene-like odour. B.p. 184°. D_4^{13} 0.8648. n_D^{13} 1.4943. $[\alpha]_D^{15} + 98.2^\circ$ in C_6H_6 .

dl-.

Liq. with citron-like odour. B.p. 184–5°. D_{15}^{15} 0.8390. Adds 2 Br.

Kay, Perkin, *J. Chem. Soc.*, 1906, 89, 848.

$\Delta^{1,4(8)}$ -*p*-Menthadienol-3 (1-Methyl-4-isopropylidene-1-cyclohexenol-3)



$\text{C}_{10}\text{H}_{16}\text{O}$

MW, 152

Liq. with odour of oranges. B.p. 96–7°/12 mm. n_D^{16} 1.397. Readily dehydrates to *p*-cymene.

Verley, *Bull. soc. chim.*, 1899, 21, 409.

$\Delta^{1,8(9)}$ -*p*-Menthadienol-6.

See Carveol.

$\Delta^{1,8(9)}$ -*p*-Menthadienol-7.

See Perillyl Alcohol.

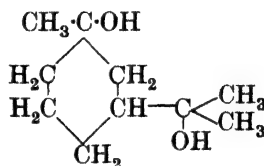
$\Delta^{6,8(9)}$ -*m*-Menthadienone-2.

See Silvecarvone.

$\Delta^{1,8}$ -*p*-Menthadienone-6.

See Carvone.

m-Menthandiols-1 : 8 (1-Methyl-3- β -hydroxyisopropylcyclohexanol-1)



$\text{C}_{10}\text{H}_{20}\text{O}_2$

MW, 172

“*Cis*” :

Woolly mass from Et_2O . M.p. 94°. Sol. H_2O , Et_2O .

“*Trans*” :

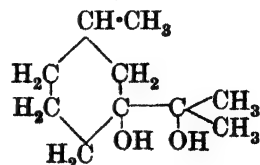
Needles from pet. ether. M.p. 126–7°. Sol. H_2O , EtOH . Spar. sol. pet. ether.

Optically active form : see Silveterpin.

Fisher, Perkin, *J. Chem. Soc.*, 1908, 93, 1889.

Perkin, Tattersall, *J. Chem. Soc.*, 1907, 91, 502.

m-Menthandiols-3 : 8 (1-Methyl-3- β -hydroxyisopropylcyclohexanol-3)



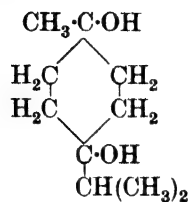
$\text{C}_{10}\text{H}_{20}\text{O}_2$

MW, 172

Cryst. from pet. ether. M.p. 64°. B.p. 140°/23 mm.

Haworth, Perkin, Wallach, *J. Chem. Soc.*, 1911, 99, 132.

p-Menthadiol-1 : 4 (Terpinene-terpin)



$C_{10}H_{20}O_2$

MW, 172

Exists in two forms.

(i) Leaflets from MeOH.Aq. M.p. 137–8°. B.p. 250°. Sol. most org. solvents. Volatile in steam. Oxalic acid \rightarrow mixture of 1 : 4-cineol + terpineol-1 + terpineol-4. HCl \rightarrow terpinene dihydrochloride.

(ii) Prisms from MeOH.Aq. M.p. 116–17°. Sol. MeOH, AcOEt, $CHCl_3$. Spar. sol. H_2O , Et_2O . Volatile in steam. Same reaction with oxalic acid as above.

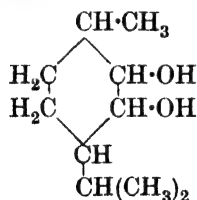
Wallach, Boedecker, *Ann.*, 1907, 356, 200.

Wallach, *Ber.*, 1907, 40, 576; *Ann.*, 1912, 392, 61.

p-Menthadiol-1 : 8.

See Terpin.

p-Menthadiol-2 : 3



$C_{10}H_{20}O_2$

MW, 172

Exists in two forms.

“Solid” :

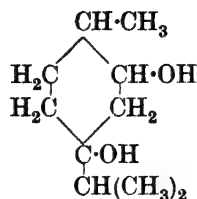
Prisms from pet. ether. M.p. 92°. Sol. most org. solvents. Spar. sol. H_2O . Ox. \rightarrow p-menthanol-3-one-2 or p-menthanol-2-one-3. HI at 185° \rightarrow p-menthane. $P_2O_5 \rightarrow$ propylene + m-cresol.

“Liquid” :

B.p. 141–3°/13 mm. D_{41}^{21} 0.9950. n_D^{21} 1.4787.

Kondakow, Bachtshiev, *J. prakt. Chem.*, 1901, 63, 63.

p-Menthadiol-2 : 4



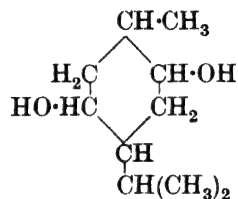
$C_{10}H_{20}O_2$

MW, 172

Cryst. mass. M.p. 93–4°. B.p. 135–40°/9 mm.

Wallach, *Ann.*, 1917, 414, 201.

p-Menthadiol-2 : 5



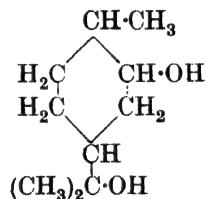
$C_{10}H_{20}O_2$

MW, 172

Needles from C_6H_6 . M.p. 112°. B.p. 155°/15 mm. Very sol. most org. solvents. Spar. sol. H_2O .

Henderson, Sutherland, *J. Chem. Soc.*, 1910, 97, 1618.

p-Menthadiol-2 : 8



$C_{10}H_{20}O_2$

MW, 172

Several modifications are known.

α :

d -.

Cryst. from H_2O . M.p. 112–13°. B.p. 265–70°. $[\alpha]_D^{18} + 21^\circ$.

l -.

Cryst. from H_2O . M.p. 112–13°. B.p. 265–70°. $[\alpha]_D^{18} - 21^\circ$.

dl -.

M.p. 108–9°.

β :

Needles from C_6H_6 . M.p. 103–4°. $[\alpha]_D^{21} + 12.6^\circ$ in EtOH. Sol. H_2O .

γ - Dihydrosobrerol, l -dihydropinol hydrate.

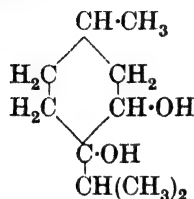
M.p. 158–9°. $[\alpha]_D^{20} - 40.2^\circ$ in EtOH. HBr \rightarrow terpinene dihydrobromide.

δ-. Inactive dihydropinol hydrate.
M.p. 139–40°. HBr → terpinene dihydrobromide. Oxalic acid → dihydrocarveol.

Wallach, *Ann.*, 1911, **381**, 62; 1917, **414**, 196.

Rupe, Schlochoff, *Ber.*, 1905, **38**, 1721.

p-Menthadiol-3 : 4



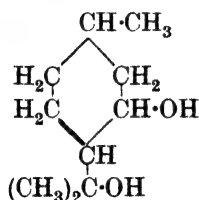
$C_{10}H_{20}O_2$ MW, 172

M.p. 76–7°. B.p. 129–31°/13 mm. D_4^{20} 1.0159.
Boiled with dil. H_2SO_4 → menthone.

Diacetyl : b.p. 165–72°/21 mm.

Wagner, *Ber.*, 1894, **27**, 1640.

p-Menthadiol-3 : 8 (1-Methyl-4-β-hydroxyisopropylcyclohexanol-3, isopulegol hydrate, menthoglycol)



$C_{10}H_{20}O_2$ MW, 172

Needles from pet. ether. M.p. 84–5° (66°).
B.p. 144–5°/10 mm. Ac_2O → monoacetate.
 $Ac_2O + AcONa$ → isopulegol acetate.

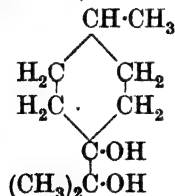
Monoacetate : b.p. 137–8°/10 mm.

Barbier, Leser, *Compt. rend.*, 1897, **124**, 1309.

Prins, *Chem. Zentr.*, 1917, II, 289.

Grignard, Doeuvre, *Compt. rend.*, 1928, **187**, 273.

p-Menthadiol-4 : 8 (1-Methyl-4-β-hydroxyisopropylcyclohexanol-4)



$C_{10}H_{20}O_2$ MW, 172

Exists in two forms.

(i) "High-melting" :

Cryst. from MeOH.Aq. M.p. 97–8°. B.p.

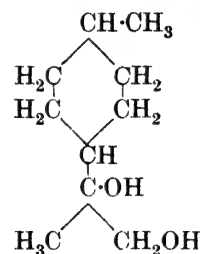
245°. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. H_2O , ligroin. Volatile in steam. Ox. → 4-methylcyclohexanone-1.

(ii) "Low-melting" :

Cryst. from MeOH.Aq. M.p. 82–3°. More sol. than above form. Volatile in steam.

Wallach, *Ann.*, 1910, **374**, 221.

p-Menthadiol-8 : 9 (1-Methyl-4-α : β-dihydroxyisopropylcyclohexane)

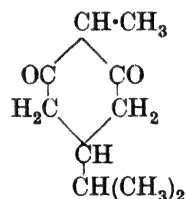


$C_{10}H_{20}O_2$ MW, 172

B.p. 165°. Ox. → p-methylhexahydroacetophenone.

Semmler, Rimpel, *Ber.*, 1906, **39**, 2584.

p-Menthandione-2 : 6



$C_{10}H_{16}O_2$ MW, 168

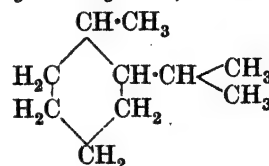
Leaflets from H_2O . M.p. 170°. Decomp. in exsiccator.

Dioxime : prisms. M.p. 194–6° decomp.

Harries, Stirm, *Ber.*, 1901, **34**, 1932.

Fichter, Jetzer, Leepin, *Ann.*, 1913, **395**, 25.

o-Menthane (1-Methyl-2-isopropylcyclohexane, hexahydro-o-cymene)



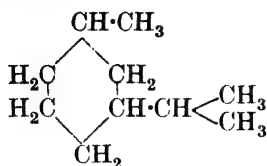
$C_{10}H_{20}$ MW, 140

B.p. 171°. D_4^{20} 0.8135. n_D^{20} 1.447.

Sabatier, Murat, *Ann. chim.*, 1915, **4**, 274.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1079.

m-Menthane (1-Methyl-3-isopropylcyclohexane, hexahydro-m-cymene)



$C_{10}H_{20}$ MW, 140

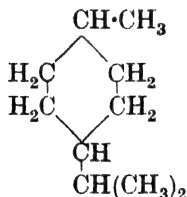
d-.
B.p. 167–8°. D_0^{23} 0.8116. n_D^{23} 1.446. $[\alpha]_D^{23}$ +1.6°.

l-.
B.p. 167–8°/749 mm. D_0^{20} 0.7938. n_D^{20} 1.4358. $[\alpha]_D$ –0.3°.

dl-.
B.p. 166–7°. D_0^{24} 0.7965. n_D^{24} 1.44.

Sabatier, Murat, *Ann. chim.*, 1915, **4**, 275.
Kishner, Sawadowski, *Chem. Zentr.*, 1912, I, 1456.

p-Menthane (Terpane, menthonaphthene, hexahydro-p-cymene, 1-methyl-4-isopropylcyclohexane)



$C_{10}H_{20}$ MW, 140

Liq. with faint peppermint-like odour. B.p. 169–70°. D_0^{20} 0.8067, D_D^{20} 0.7929. n_D^{21} 1.4375.

Cis:
B.p. 168.5°. D_4^{20} 0.816. n_D^{20} 1.4515.

Trans:
B.p. 161°. D_4^{20} 0.792. n_D^{20} 1.4393.

Skita, Schneck, *Ber.*, 1922, **55**, 148.
Sabatier, Senderens, *Compt. rend.*, 1901, **132**, 566.
Jünger, Klages, *Ber.*, 1896, **29**, 317.
Perkin, Pickles, *J. Chem. Soc.*, 1905, **87**, 652.
Konowalow, *Chem. Zentr.*, 1904, I, 1516.

Menthane-2-acetic Acid.

See 2-Menthylacetic Acid.

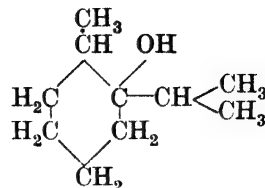
Menthane-diol.

See Menthandiol.

Menthane-2-β-propionic Acid.

See 2-Menthyl-β-propionic Acid.

o-Menthanol-2 (2-Methyl-1-isopropylcyclohexanol)

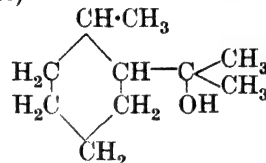


$C_{10}H_{20}O$ MW, 156

B.p. 93–5°/25 mm.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1081.

o-Menthanol-8 (1-Methyl-2-β-hydroxyisopropylcyclohexane)

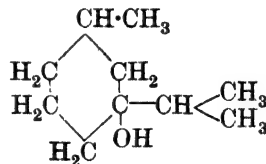


$C_{10}H_{20}O$ MW, 156

Cryst. M.p. 56–8°. B.p. 97–8°/16 mm. Sol. most org. solvents.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1078.

m-Menthanol-3 (3-Methyl-1-isopropylcyclohexanol)

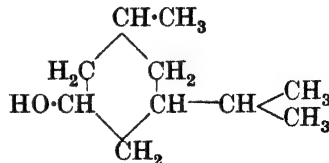


$C_{10}H_{20}O$ MW, 156

B.p. 186–8°, 81–3°/4 mm.

Zelinsky, *Ber.*, 1901, **34**, 2881.

m-Menthanol-5 (3-Methyl-5-isopropylcyclohexanol)



$C_{10}H_{20}O$ MW, 156

“*Cis*”:

B.p. 226–7°. $D_4^{18.6}$ 0.9020. $n_D^{18.6}$ 1.4645.

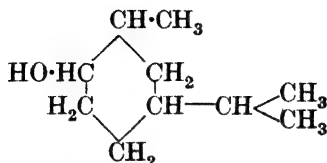
“*Trans*”:

Liq. with peppermint odour. B.p. 227–8°.

D^{20}_D 0.8989. n_D 1.4596. Sol. most org. solvents. Spar. sol. H_2O .

Knoevenagel, Wiedermann, *Ann.*, 1897, 297, 128, 169, 182.

m-Menthanol-6 (2-Methyl-4-isopropylcyclohexanol)

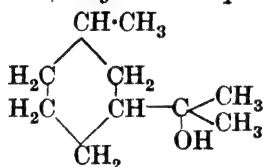


$C_{10}H_{20}O$ MW, 156

B.p. 119–21°/28 mm. D^{20}_D 0.9156. n_D^{20} 1.4666. Sol. EtOH, Et₂O. Spar. sol. H_2O .

Henderson, Smeaton, *J. Chem. Soc.*, 1920, 117, 147.

m-Menthanol-8 (1-Methyl-3-β-hydroxyisopropylcyclohexane, dihydrosilveterpineol)



$C_{10}H_{20}O$ MW, 156

Exists in two forms.

(i) B.p. 206–9°. D^{20}_D 0.91. n_D^{20} 1.4663. $[\alpha]_D + 1.96^\circ$ in MeOH. $CrO_3 \rightarrow d$ -1-methylcyclohexanone-3.

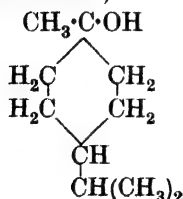
Phenylurethane : m.p. 82–3°.

(ii) B.p. 206–8°. D^{18}_D 0.909. n_D^{18} 1.4645. $[\alpha]_D + 10.35^\circ$. $CrO_3 \rightarrow dl$ -1-methylcyclohexanone-3.

Phenylurethane : m.p. 77°.

Haworth, Perkin, Wallach, *J. Chem. Soc.*, 1913, 103, 1238; *Ann.*, 1913, 399, 170.

p-Menthanol-1 (1-Methyl-4-isopropylcyclohexanol, tert.-carvomenthol)



$C_{10}H_{20}O$ MW, 156

B.p. 208–9°, 96–100°/17 mm. D^{20}_D 0.90. n_D^{20} 1.4619.

Phenylurethane : m.p. 100–1°.

Baeyer, *Ber.*, 1893, 26, 2270.

Jordan, U.S.P., 1,782,621, (*Chem. Abstracts*, 1931, 25, 303).

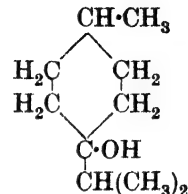
p-Menthanol-2.

Carvomenthol, *q.v.*

p-Menthanol-3.

See Menthol and Isomenthol.

p-Menthanol-4 (4-Methyl-1-isopropylcyclohexanol)



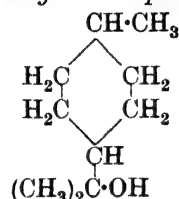
$C_{10}H_{20}O$ MW, 156

B.p. 206–7°, 97–100°/20 mm. D^{20}_D 0.9023. n_D^{20} 1.4619.

Kondakow, Schindelmeyer, *J. prakt. Chem.*, 1903, 67, 194.

Tschugaeff, *Chem. Zentr.*, 1904, I, 1347.

p-Menthanol-8 (1-Methyl-4-β-hydroxyisopropylcyclohexane, dihydro-α-terpineol)



$C_{10}H_{20}O$ MW, 156

“Cis” :

B.p. 210°. D^{20}_D 0.9124. n_D^{20} 1.4665.

Phenylurethane : m.p. 90–2°.

“Trans” :

M.p. 34–5°. B.p. 209–15°. D^{20}_D 0.901. n_D^{20} 1.463.

Acetyl : b.p. 104°/16 mm.

Phenylurethane : m.p. 117–18°.

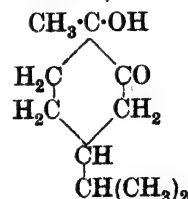
Allophanate : m.p. 187°.

Zeitschel, Schmidt, *Ber.*, 1927, 60, 1375.

Wallach, *Ann.*, 1911, 381, 55.

Perkin, Pickles, *J. Chem. Soc.*, 1905, 87, 650.

1-p-Menthanolone-2. (Hydroxycarvomenthone, 1-hydroxytetrahydrocarvone, 1-methyl-4-isopropyl-1-cyclohexanolone-2)



$C_{10}H_{18}O_2$

MW, 170

Exists in two forms.

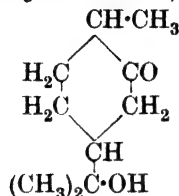
(i) B.p. 118–22°/18 mm. D_4^{20} 0.977. n_D^{20} 1.469. Reduces $\text{NH}_3 \cdot \text{AgNO}_3$.

(ii) B.p. 128°/14 mm. (118–22°/18 mm.). Oxalic acid at 110–20° \rightarrow *dl*-carvotanacetone.

Wallach, *Ann.*, 1918, **414**, 354.

Kötz, Steinhorst, *Ann.*, 1911, **379**, 26.

8-*p*-Menthanolone-2 (8-Hydroxytetrahydrocarvone, dihydrocarvone hydrate, 2-methyl-5- β -hydroxyisopropylcyclohexanone)



$\text{C}_{10}\text{H}_{18}\text{O}_2$ MW, 170

Viscous liq. B.p. 138–9°/9 mm. D_4^{19} 1.006. n_D^{20} 1.476. $[\alpha]_D^{20}$ –18.5° in EtOH. $\text{NaHg} \rightarrow$ *p*-menthandiol-2:8. Boiling dil. $\text{H}_2\text{SO}_4 \rightarrow$ carvenone.

Oxime: cryst. from EtOH. M.p. 120–1°. Spar. sol. H_2O .

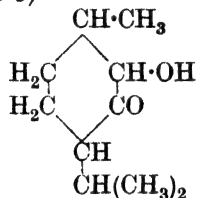
Semicarbazone: cryst. from MeOH. M.p. 150–1° (139°).

Baeyer, *Ber.*, 1895, **28**, 1590.

Knoevenagel, Samel, *Ber.*, 1906, **39**, 685.

Rupe, Liechtenhan, *ibid.*, 1125.

2-*p*-Menthanolone-3 (1-Methyl-4-isopropyl-2-cyclohexanolone-3)



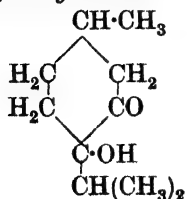
$\text{C}_{10}\text{H}_{18}\text{O}_2$ MW, 170

B.p. 139°/17 mm., 105–15°/13 mm. D_4^{20} 0.968. n_D^{20} 1.4616.

Semmler, McKenzie, *Ber.*, 1906, **39**, 1163.

Kötz *et al.*, *Ann.*, 1913, **400**, 71.

4-*p*-Menthanolone-3 (Menthene-ketol, 1-methyl-4-isopropyl-4-cyclohexanolone-3)



$\text{C}_{10}\text{H}_{18}\text{O}_2$ MW, 170

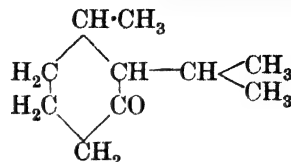
B.p. 104–5°/13.5 mm. D_4^0 0.9881. Oxalic acid \rightarrow Δ^3 -*p*-menthenone-5.

Oxime: plates from EtOH. M.p. 132–3°.

Wagner, *Ber.*, 1894, **27**, 1639.

Kötz, Steinhorst, *Ann.*, 1911, **379**, 23.

o-Menthanone-3 (3-Methyl-2-isopropylcyclohexanone)



$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

Liq. with peppermint-like odour. B.p. 204°, 95°/25 mm.

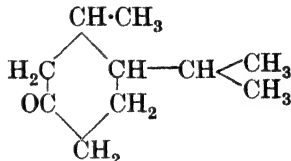
Semicarbazone: m.p. 204–5°.

Benzylidene deriv.: m.p. 162°.

Kötz, Blendermann, Mähner, Rosenbusch, *Ann.*, 1913, **400**, 85.

Dieckmann, *Ber.*, 1912, **45**, 2701.

o-Menthanone-5 (3-Methyl-4-isopropylcyclohexanone)



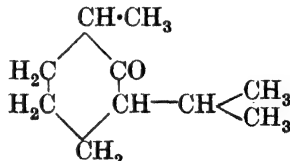
$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 226–8°/741 mm. D_4^{20} 0.9141. n_D^{20} 1.46. $[\alpha]_D^{20}$ +99° in Et₂O.

Semicarbazone: m.p. 177°.

Wienhaus, Schumm, *Ann.*, 1924, **439**, 41.

m-Menthanone-2 (2-Methyl-6-isopropylcyclohexanone)

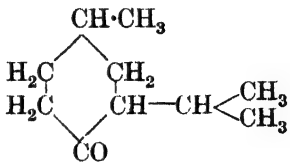


$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 82°/10 mm. D_4^{15} 0.9128. Gives no carbonyl derivs.

Kötz, Michels, *Ann.*, 1906, **348**, 96; **350**, 216.

m-Menthanone-4 (4-Methyl-2-isopropylcyclohexanone)



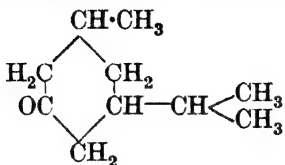
$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 195°. D_4^{15} 0.8914.

Oxime : m.p. 105°.

See first reference above.

m-Menthane-5 (3-Methyl-6-isopropylcyclohexanone)



$C_{10}H_{18}O$

MW, 154

Oil with peppermint-like odour. B.p. 224-6°.

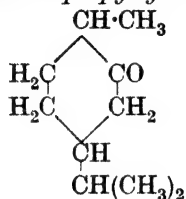
D_4^{18} 0.9040. n_D^{18} 1.4536.

Semicarbazone : m.p. 179-81°.

Knoevenagel, *Ann.*, 1897, 297, 172.

Wallach, *Ann.*, 1913, 397, 210.

p-Menthane-2 (Carvomenthone, tetrahydrocarvone, 2-methyl-5-isopropylcyclohexanone)



$C_{10}H_{18}O$

MW, 154

l-.

B.p. 220°. D_4^{20} 0.904. n_D^{20} 1.4553. $[\alpha]_D^{19}$ -27.95° in MeOH. Ox. \rightarrow 2-isopropyl-4-aceto-n-valeric acid.

Oxime : needles. M.p. 99-100°. $[\alpha]_D^{18}$ -35.7° in EtOH.

Semicarbazone : needles from EtOH. M.p. 193°. Spar. sol. EtOH.

i-.

B.p. 220-1°. D_4^{20} 0.904. n_D^{20} 1.454.

Oxime : needles from pet. ether. M.p. 105°. Sol. EtOH. Spar. sol. pet. ether.

Semicarbazone : plates from MeOH. M.p. 174°.

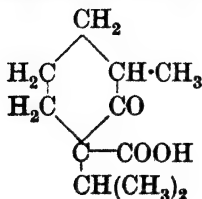
Wallach, *Ann.*, 1893, 277, 133; 1911, 381, 65; 1918, 414, 349.

Vavon, *Compt. rend.*, 1911, 153, 70.

p-Menthane-3.

See Menthone.

m-2-Menthane-3-carboxylic Acid



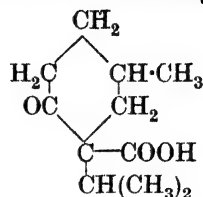
$C_{11}H_{18}O_3$

MW, 198

Et ester : $C_{13}H_{22}O_3$. MW, 226. B.p. 128°/10 mm. Heat \rightarrow m-menthanone-2.

Kötz, Michels, *Ann.*, 1906, 348, 95.

m-4-Menthane-3-carboxylic Acid



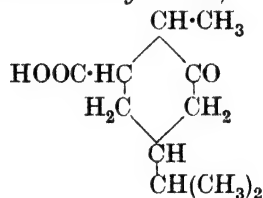
$C_{11}H_{18}O_3$

MW, 198

Et ester : $C_{13}H_{22}O_3$. MW, 226. B.p. 125-7°/10 mm. Semicarbazone : cryst. M.p. 130°.

See previous reference.

p-2-Menthane-6-carboxylic Acid (Carvomenthone-6-carboxylic acid)



$C_{11}H_{18}O_3$

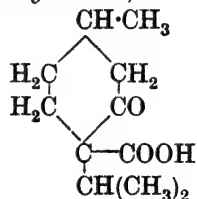
MW, 198

Prisms from CCl_4 . M.p. 146-7°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. H_2O , pet. ether. $[\alpha]_D^{20}$ -4.3° in $AcOEt$.

Nitrile : 6-cyanocarvomenthone. $C_{11}H_{17}ON$. MW, 179. Needles from EtOH. M.p. 83-4°. Sol. EtOH, C_6H_6 , $CHCl_3$. Alkalis \rightarrow carvotanacetone. Oxime : cryst. M.p. 156-7°.

Lapworth, *J. Chem. Soc.*, 1906, 89, 1829.

p-3-Menthane-4-carboxylic Acid (Menthone-4-carboxylic acid)



$C_{11}H_{18}O_3$

MW, 198

Inactive form :

Et ester : $C_{13}H_{22}O_3$. MW, 226. B.p. 165-8°/20 mm. Heat with conc. alc. KOH \rightarrow inactive p-menthanone-3.

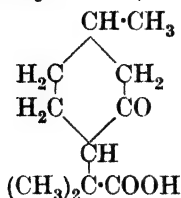
Active form :

Et ester : b.p. 135-7°/10 mm. D_4^{14} 1.009. Alc. KOH \rightarrow dextrorotatory p-menthanone-3. Semicarbazone : cryst. M.p. 144-5°.

Einhorn, Klages, *Ber.*, 1901, 34, 3793.

Kötz, Schwarz, *Ann.*, 1907, 357, 200.

p-3-Menthanone-8-carboxylic Acid
(*Menthone-8-carboxylic Acid*)



$C_{11}H_{18}O_3$

MW, 198

Needles from AcOH.Aq. or AcOEt. M.p. 121°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃, AcOH. Spar. sol. H₂O. $[\alpha]_D -23.0^\circ$ in EtOH.

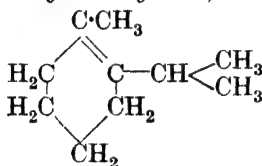
Semicarbazone: needles from MeOH. M.p. 188° decomp. Spar. sol. EtOH, C₆H₆, CHCl₃.

Clarke, Lapworth, *J. Chem. Soc.*, 1906, 89, 1874.

Menthazine.

See under Menthene.

Δ^1 -**o-Menthene** (1-Methyl-2-isopropylcyclohexene, Δ^1 -tetrahydro-o-cymene)



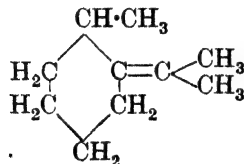
$C_{10}H_{18}$

MW, 138

Liq. with peppermint-like odour. B.p. 165-8°.

Kay, Perkin, *J. Chem. Soc.*, 1905, 87, 1082.

$\Delta^{2(8)}$ -**o-Menthene** (1-Methyl-2-isopropylidene-cyclohexane)



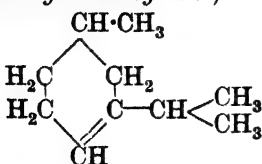
$C_{10}H_{18}$

MW, 138

B.p. 173° (160-2°). D_4^{20} 0.8345. n_D^{20} 1.467. $KMnO_4 \rightarrow$ 2-methylcyclohexanol.

Wallach, Churchill, *Ann.*, 1908, 360, 80. See also previous reference.

Δ^3 -**m-Menthene** (3-Methyl-1-isopropylcyclohexene, Δ^3 -tetrahydro-m-cymene)



$C_{10}H_{18}$

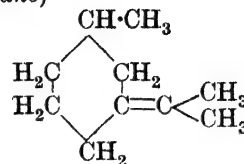
MW, 138

B.p. 168-9°.

Nitroschloride: leaflets from EtOH. M.p. 130-2°.

Perkin, Tattersall, *J. Chem. Soc.*, 1905, 87, 1105.

$\Delta^{3(8)}$ -**m-Menthene** (1-Methyl-3-isopropylidenecyclohexane)



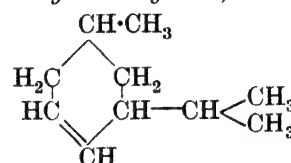
$C_{10}H_{18}$

MW, 138

B.p. 173-5°. D_4^{20} 0.8214. n_D^{20} 1.4670. 1% $KMnO_4 \rightarrow$ 3-methylcyclohexanone + acetone. 2% $KMnO_4 \rightarrow$ i-2-methyladipic acid.

Wallach, Churchill, *Ann.*, 1908, 360, 77. Kishner, Sawadowski, *Chem. Zentr.*, 1912, I, 1456.

Δ^4 -**m-Menthene** (4-Methyl-6-isopropylcyclohexene, Δ^4 -tetrahydro-m-cymene)



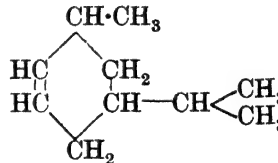
$C_{10}H_{18}$

MW, 138

B.p. 169-70°. D_4^{18} 0.8197. n_D 1.4561.

Knoevenagel, *Ann.*, 1897, 297, 173.

Δ^5 -**m-Menthene** (3-Methyl-5-isopropylcyclohexene)



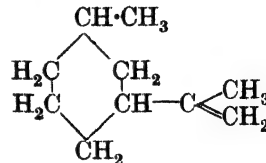
$C_{10}H_{18}$

MW, 138

B.p. 167-8°. D_4^{20} 0.8222. n_D 1.4568.

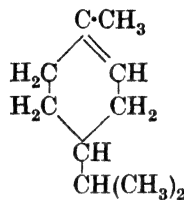
Henderson, Smeaton, *J. Chem. Soc.*, 1920, 117, 148.

$\Delta^{8(9)}$ -**m-Menthene** (1-Methyl-3-isopropenylcyclohexane)

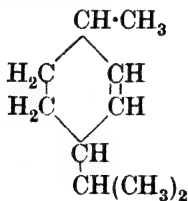


$C_{10}H_{18}$

MW, 138

d-.
B.p. 170°. D_0^{20} 0.8179. n_D 1.4546. $[\alpha]_D$ + 9.73°. $\text{KMnO}_4 \rightarrow d$ -2-methyladipic acid.*l*-.
B.p. 170–1°. D_0^{20} 0.8189. n_D 1.4574. $[\alpha]_D$ – 8.06°.Kishner, *Chem. Zentr.*, 1912, I, 1713.Kishner, Sawadowski, *ibid.*, 1456. Δ^1 -*p*-Menthene (*Carvomenthene*, Δ^1 -tetrahydro-*p*-cymene, 1-methyl-4-isopropylcyclohexene) $\text{C}_{10}\text{H}_{18}$

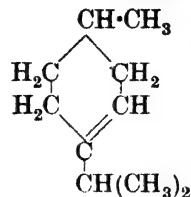
MW, 138

d-.
B.p. 175–7°. D_4^{18} 0.8246. n_D^{18} 1.4563. $[\alpha]_{578}$ + 118°.*Nitroschloride*: m.p. 95–6°. $[\alpha]_{578}$ + 344° in Et_2O .*i*-.
B.p. 174–5°. D_4^{21} 0.821. n_D^{21} 1.4551.*Nitroschloride*: cryst. from MeOH. M.p. 95–6°. $\text{AcONa} \rightarrow$ oxime of *dl*-carvotanacetone.Vavon, *Compt. rend.*, 1911, 152, 1675.Wallach, *Ann.*, 1911, 381, 58.Bogert, Hasselström, Firmenich, *Chem.**Abstracts*, 1932, 26, 448. Δ^2 -*p*-Menthene (Δ^2 -Tetrahydro-*p*-cymene, 3-methyl-6-isopropylcyclohexene) $\text{C}_{10}\text{H}_{18}$

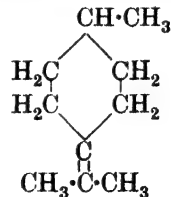
MW, 138

B.p. 55–6°/12 mm. D_0^{20} 0.824. n_D^{20} 1.461.Semmler, *Ber.*, 1909, 42, 526.Gachard, *Chem. Abstracts*, 1933, 27, 3927.

See also last reference above.

 Δ^3 -*p*-Menthene (*Menthene*, *menthomenthene*, Δ^3 -tetrahydro-*p*-cymene, 4-methyl-1-isopropylcyclohexene) $\text{C}_{10}\text{H}_{18}$

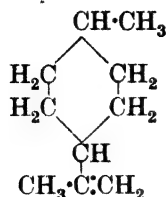
MW, 138

d-.
Exists in two forms.(i) B.p. 168°. D_4^{20} 0.8122. n_D^{20} 1.4524. $[\alpha]_D$ + 116.74°.*Nitroschloride*: m.p. 127° (140°). $[\alpha]_D$ + 230° in C_6H_6 , + 187.64° in CHCl_3 .(ii) B.p. 167–8°. D_4^{20} 0.8078. $[\alpha]_D$ varies from + 29.6° to + 55.4°. Perbenzoic acid \rightarrow oxide, b.p. 70–5°/15 mm., D_4^{14} 0.8989, n_D^{14} 1.4481, $[\alpha]_D^{14}$ + 45.4°.*Nitroschloride*: m.p. 113°. $[\alpha]_D$ + 26.4°.*l*-.
B.p. 166–8°. D_4^{19} 0.8112. n_D 1.4510. $[\alpha]_D$ – 13.46° in EtOH.*i*-.
B.p. 167–9°. D_4^{20} 0.8188. n_D 1.4536.*Nitroschloride*: cryst. from MeOH. M.p. 128–9° (133°).Kötz, Busch, *J. prakt. Chem.*, 1928, 119, 1.Tschugajew, *Ber.*, 1899, 32, 3333; 1902.35, 2474; *Chem. Zentr.*, 1904, I, 1347.Wallach, *Ann.*, 1898, 300, 285.Kondakow, Bachtshiew, *J. prakt. Chem.*, 1901, 63, 57.Kishner, *Chem. Zentr.*, 1911, II, 1925.Bogert, Hasselström, Firmenich, *Chem.**Abstracts*, 1932, 26, 448. $\Delta^{4(8)}$ -*p*-Menthene (*Dihydroterpinolene*, 1-methyl-4-isopropylidenecyclohexane) $\text{C}_{10}\text{H}_{18}$

MW, 138

B.p. 172–4°. D_4^{21} 0.819. n_D^{21} 1.4568. $\text{KMnO}_4 \rightarrow$ 4-methylcyclohexanone + acetone. Boiling dil. $\text{H}_2\text{SO}_4 \rightarrow i$ - Δ^3 -*p*-menthene.*Nitroschloride*: m.p. 101–3°. Volatile in steam.Wallach, Churchill, *Ann.*, 1908, 360, 73.Kishner, *Chem. Zentr.*, 1911, II, 1925.

$\Delta^{8(9)}$ -*p*-Menthene (1-Methyl-4-isopropenyl-cyclohexene)

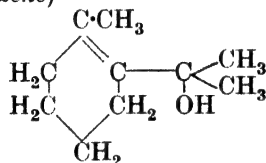
 $C_{10}H_{18}$

MW, 138

B.p. 170°. D_4^{20} 0.8142. n_D 1.4523.

Gachard, *Chem. Abstracts*, 1933, **27**, 3927.
See also second reference above.

Δ^1 -*o*-Menthenol-8 (1-Methyl-2- β -hydroxyisopropylcyclohexene)

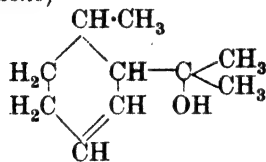
 $C_{10}H_{18}O$

MW, 154

B.p. 110–11°/35 mm. Liebermann–Burchard test \rightarrow red col.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1075.

Δ^3 -*o*-Menthenol-8 (4-Methyl-3- β -hydroxyisopropylcyclohexene)

 $C_{10}H_{18}O$

MW, 154

“*Cis*”:

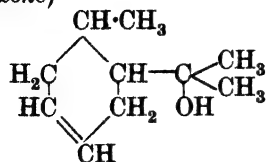
B.p. 107–8°/30 mm. Oxalic acid \rightarrow “*cis*”- $\Delta^{3,8(9)}$ -*o*-menthadiene.

“*Trans*”:

B.p. 110–11°/30 mm. Oxalic acid \rightarrow “*trans*”- $\Delta^{3,8(9)}$ -*o*-menthadiene.

Perkin, *J. Chem. Soc.*, 1911, **99**, 751.

Δ^4 -*o*-Menthenol-8 (4-Methyl-5- β -hydroxyisopropylcyclohexene)

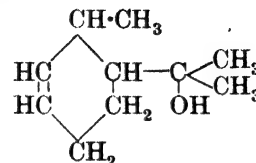
 $C_{10}H_{18}O$

MW, 154

Liq. with odour of peppermint. B.p. 110°/30 mm. Dil. $H_2SO_4 \rightarrow \Delta^{4,8(9)}$ -*o*-menthadiene.
Phenylurethane: m.p. 119–20°.

Perkin, *J. Chem. Soc.*, 1911, **99**, 756.

Δ^5 -*o*-Menthenol-8 (3-Methyl-4- β -hydroxyisopropylcyclohexene)

 $C_{10}H_{18}O$

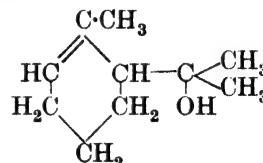
MW, 154

B.p. 198–200°, 140°/100 mm., 110–12°/30 mm. D_{20}^{20} 0.9404. n_D 1.4792. Oxalic acid $\rightarrow \Delta^{5,8(9)}$ -*o*-menthadiene.

Phenylurethane: m.p. 118–19°.

Perkin, *J. Chem. Soc.*, 1911, **99**, 736.

Δ^6 -*o*-Menthenol-8 (1-Methyl-6- β -hydroxyisopropylcyclohexene)

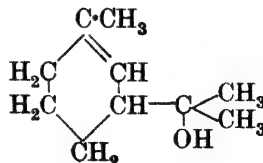
 $C_{10}H_{18}O$

MW, 154

B.p. 200–2°, 107–8°/30 mm. D_{20}^{20} 0.9412. n_D 1.4811. Oxalic acid $\rightarrow \Delta^{6,8(9)}$ -*o*-menthadiene. Liebermann–Burchard test \rightarrow orange-brown col.

Perkin, *J. Chem. Soc.*, 1911, **99**, 740.

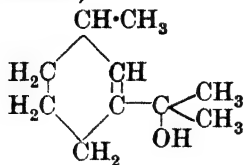
Δ^1 -*m*-Menthenol-8 (1-Methyl-3- β -hydroxyisopropylcyclohexene)

 $C_{10}H_{18}O$

MW, 154

B.p. 105–8°/30 mm. D_{15}^{15} 0.9257. n_D^{15} 1.4752. $KHSO_4 \rightarrow$ carvestrene. Liebermann–Burchard test \rightarrow violet col.

Perkin, Tattersall, *J. Chem. Soc.*, 1907, **91**, 498.

Δ^2 -*m*-Menthenol-8 (1-Methyl-3- β -hydroxy-isopropylcyclohexene) $C_{10}H_{18}O$

MW, 154

d-.

B.p. 206-8°, 103-5°/22 mm. D_{20}^{22} 0.923. n_D 1.4728. $[\alpha]_D + 55.56^\circ$. $KMnO_4 \rightarrow$ 2-methyl-adipic acid.

Phenylurethane : m.p. 124°.

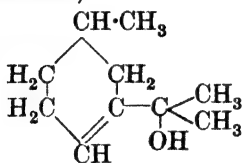
i-.

B.p. 110°/30 mm. D_{20}^{20} 0.9281. n_D 1.4772. $KHSO_4 \rightarrow \Delta^{2,8(9)}$ -*m*-menthadiene. Liebermann-Burchard test \rightarrow violet-blue col.

Phenylurethane : m.p. 127° decomp.

Perkin, Tattersall, *J. Chem. Soc.*, 1905, 87, 1101.

Haworth, Perkin, Wallach, *Ann.*, 1911, 379, 141.

 Δ^3 -*m*-Menthenol-8 (4-Methyl-2- β -hydroxy-isopropylcyclohexene) $C_{10}H_{18}O$

MW, 154

d-.

B.p. 107-8°/25 mm. D_{20}^{20} 0.9235. n_D 1.4791. $[\alpha]_D + 20.9^\circ$ in AcOEt. Oxalic acid $\rightarrow d$ - $\Delta^{3,8(9)}$ -*m*-menthadiene.

l-.

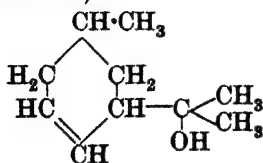
B.p. 102-3°/14 mm. $[\alpha]_D - 18.5^\circ$ in AcOEt. Oxalic acid $\rightarrow l$ - $\Delta^{3,8(9)}$ -*m*-menthadiene.

i-.

B.p. 115°/35 mm. D_{20}^{20} 0.9268. n_D 1.4798. Oxalic acid $\rightarrow i$ - $\Delta^{3,8(9)}$ -*m*-menthadiene.

Phenylurethane : m.p. 130°.

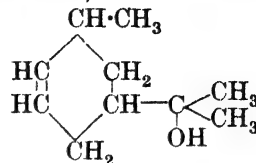
Luff, Perkin, *J. Chem. Soc.*, 1911, 99, 524.

 Δ^4 -*m*-Menthenol-8 (4-Methyl-6- β -hydroxy-isopropylcyclohexene) $C_{10}H_{18}O$

MW, 154

B.p. 115-17°/30 mm. Oxalic acid $\rightarrow \Delta^{4,8(9)}$ -*m*-menthadiene.

Perkin, *J. Chem. Soc.*, 1910, 97, 2147.

 Δ^5 -*m*-Menthenol-8 (3-Methyl-5- β -hydroxy-isopropylcyclohexene) $C_{10}H_{18}O$

MW, 154

d-.

B.p. 115°/30 mm. $[\alpha]_D^{16} + 36.7^\circ$ in EtOH. Oxalic acid $\rightarrow d$ - $\Delta^{5,8(9)}$ -*m*-menthadiene + a little *d*- $\Delta^{5,3(8)}$ -*m*-menthadiene. Liebermann-Burchard test \rightarrow red col.

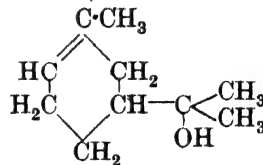
l-.

B.p. 104-5°/20 mm. $[\alpha]_D^{17} - 32.6^\circ$ in AcOEt. Oxalic acid $\rightarrow l$ - $\Delta^{5,8(9)}$ -*m*-menthadiene + a little *l*- $\Delta^{5,3(8)}$ -*m*-menthadiene.

i-.

B.p. 115-17°/30 mm. Oxalic acid $\rightarrow i$ - $\Delta^{5,8(9)}$ -*m*-menthadiene + a little *i*- $\Delta^{5,3(8)}$ -*m*-menthadiene.

Perkin, *J. Chem. Soc.*, 1910, 97, 2139.

 Δ^6 -*m*-Menthenol-8 (1-Methyl-5- β -hydroxy-isopropylcyclohexene) $C_{10}H_{18}O$

MW, 154

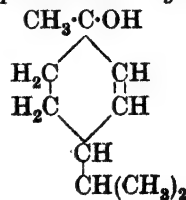
B.p. 106-7°/20 mm. D_{20}^{20} 0.9376. n_D^{20} 1.4775. Dil. $H_2SO_4 \rightarrow cis$ -*m*-menthene-diol-1 : 8. HCl \rightarrow carvestrene dihydrochloride.

Nitroschloride : m.p. 125°.

Fischer, Perkin, *J. Chem. Soc.*, 1908, 93, 1888.

 Δ^1 -*p*-Menthenol-8.

See α -Terpineol.

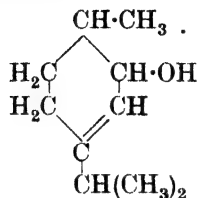
 Δ^2 -*p*-Menthenol-1 (3-Methyl-6-isopropyl-cyclohexenol-3, α -phellandrene hydrate) $C_{10}H_{18}O$

MW, 154

B.p. 208–11°, 92°/10 mm. D_4^{20} 0.923. n_D^{19} 1.4760.

Wallach, *Ann.*, 1908, **359**, 285.

Δ^3 -*p*-Menthenol-2 (*Carvenol*, 4-methyl-1-isopropylcyclohexenol-3)



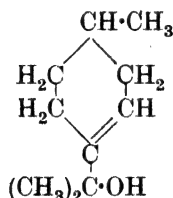
$C_{10}H_{18}O$

MW, 154

B.p. 219–21°, 107–9°/16 mm. D_4^{20} 0.925. n_D 1.479. $CrO_3 \rightarrow$ carvenone. Hydrogenation \rightarrow carvomenthol.

Wallach, *Ann.*, 1918, **414**, 202.

Δ^3 -*p*-Menthenol-8 (4-Methyl-1- β -hydroxyisopropylcyclohexene)



$C_{10}H_{18}O$

MW, 154

d-.
B.p. 105°/20 mm. D_4^{20} 0.9236. n_D 1.4783.

$[\alpha]_D^{20} + 83.2^\circ$ in AcOEt. Volatile in steam. Oxalic acid \rightarrow *d*- $\Delta^{3,8(9)}$ -*p*-menthadiene.

l-.
B.p. 101–2°/14 mm. $[\alpha]_D^{15} - 67.3^\circ$ in C_6H_6 .

$KHSO_4 \rightarrow$ terpinene + *l*- $\Delta^{3,8(9)}$ -*p*-menthadiene.

i-.
M.p. 38–40°. B.p. 205°, 120°/25 mm., 102°/14 mm. D_4^{10} 0.9251, D_4^{15} 0.9055. n_a^{19} 1.4754, n_a^{25} 1.4634. $KHSO_4 \rightarrow$ terpinene + *i*- $\Delta^{3,8(9)}$ -*p*-menthadiene.

Kay, Perkin, *J. Chem. Soc.*, 1906, **89**, 847.

Semmler, Rimpel, *Ber.*, 1906, **39**, 2586.

Chou, Perkin, *J. Chem. Soc.*, 1911, **99**, 537.

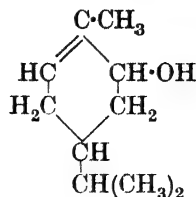
$\Delta^4(8)$ -*p*-Menthenol-1.

See γ -Terpineol.

$\Delta^4(8)$ -*p*-Menthenol-3.

See Pulegol.

Δ^6 -*p*-Menthenol-2 (1-Methyl-4-isopropylcyclohexenol-6)



$C_{10}H_{18}O$

MW, 154

B.p. 109–10°/13 mm. D_4^{15} 0.9275. $[\alpha]_D^{20} + 7.90^\circ$. Perbenzoic acid \rightarrow oxide, b.p. 147–8°/17 mm.

Prilezhaev, Verschuk, *Chem. Abstracts*, 1929, **23**, 4464.

$\Delta^8(9)$ -*p*-Menthenol-1.

See β -Terpineol.

$\Delta^8(9)$ -*p*-Menthenol-2.

See Dihydrocarveol.

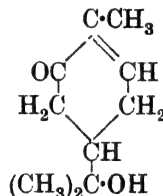
$\Delta^8(9)$ -*p*-Menthenol-3.

See Isopulegol.

Δ^1 -*p*-2-Menthenolone-3.

See Buchu-camphor.

Δ^1 -*p*-8-Menthenolone-6 (*Hydroxycarvotanacetone*, *carvone hydrate*, 1-methyl-4- β -hydroxyisopropylcyclohexenone-6)



$C_{10}H_{16}O_2$

MW, 168

d-.
Cryst. from Et_2O -pet. ether. M.p. 42–3°.

B.p. 160°/16 mm., 154°/10 mm. $[\alpha]_D^{20} + 43^\circ$ in EtOH. Spar. sol. H_2O , pet. ether. Heat \rightarrow carvacrol + carvone. $Na + EtOH \rightarrow \alpha$ -*p*-menthandiol-2 : 8.

Oxime: needles from EtOH.Aq. M.p. 114°.

Semicarbazone: cryst. from EtOH. M.p. 176–9°.

i-.
B.p. 170°/20 mm., 154°/10 mm., 145°/5 mm.

D_4^{10} 1.069. n_D^{15} 1.5065. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O . $KMnO_4 \rightarrow$ acetone + terpenylic acid. $NaHg \rightarrow \Delta^1$ -*p*-menthene-diol-6 : 8. Oxalic acid \rightarrow carvacrol + carvone. Boiling dil. $H_2SO_4 \rightarrow$ carvacrol.

Oxime: needles from EtOH.Aq. M.p. 134° (138.5°). Conc. $H_2SO_4 \rightarrow$ 4-aminothymol. *Diacetyl*: m.p. 107°.

Semicarbazone: needles from EtOH. M.p. 176°.

Knoevenagel, Samel, *Ber.*, 1906, **39**, 679.

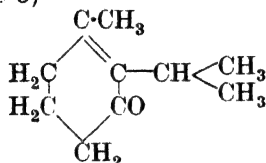
Rupe, Schlochoff, *Ber.*, 1905, **38**, 1719.

Balbiano, Paolini, *Atti accad. Lincei*, 1902, **11**, 67.

Cusmano, *Gazz. chim. ital.*, 1910, **40**, 130.

Henderson, Agnew, *J. Chem. Soc.*, 1909, **95**, 293.

Δ^1 -*o*-Menthenone-3 (1-Methyl-2-isopropylcyclohexenone-3)



$C_{10}H_{16}O$ MW, 152

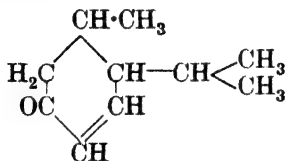
B.p. 217–19°. Ox. \longrightarrow isobutyric + 3-acetobutyric acids.

Oxime: m.p. 105–6°. Sol. most org. solvents. Spar. sol. H_2O . Volatile in steam. *B.HCl*: m.p. 135°.

Semicarbazone: needles from EtOH. M.p. 167–8°.

Dieckmann, *Ber.*, 1912, **45**, 2700.

Δ^3 -*o*-Menthenone-5 (4-Methyl-3-isopropylcyclohexenone-6)



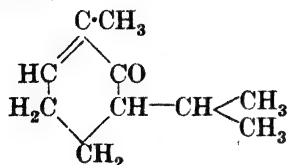
$C_{10}H_{16}O$ MW, 152

B.p. 120–3°/22 mm. D_4^{20} 0.9460. n_D^{20} 1.4912. $H \longrightarrow$ *o*-menthanone-5.

Semicarbazone: m.p. 188°.

Wienhaus, Schumm, *Ann.*, 1924, **439**, 40.

Δ^6 -*m*-Menthenone-2 (1-Methyl-5-isopropylcyclohexenone-6)



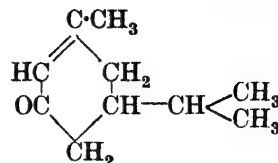
$C_{10}H_{16}O$ MW, 152

B.p. 208–9°. D_4^{20} 0.9202. n_D^{20} 1.4749.

Semicarbazone: cryst. from MeOH. M.p. 151°.

Wallach, Churchill, *Ann.*, 1908, **360**, 78.

Δ^6 -*m*-Menthenone-5 (1-Methyl-5-isopropylcyclohexenone-3)



$C_{10}H_{16}O$ MW, 152

B.p. 244°, 150°/45 mm., 124°/15 mm. D_4^{21} 0.934. n_D^{21} 1.4865°. Misc. with most org. solvents.

Oxime: m.p. 117–18°. Sol. EtOH, C_6H_6 . Spar. sol. Et_2O , $CHCl_3$.

Semicarbazone: cryst. from EtOH. M.p. 166–7°.

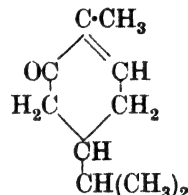
Knoevenagel, *Ann.*, 1897, **297**, 146; 1895, **288**, 329.

Wallach, *Ann.*, 1913, **397**, 209.

Δ^1 -*p*-Menthenone-3.

See Piperitone.

Δ^1 -*p*-Menthenone-6 (Carvotanacetone, 1-methyl-4-isopropylcyclohexenone-6)



$C_{10}H_{16}O$ MW, 152

d-.

B.p. 227–8°, 96–7°/9 mm. D_4^{19} 0.9351. $[\alpha]_D^{25} + 49.5^\circ$. Red. \longrightarrow carvomenthol. Ox. \longrightarrow pyruvic acid.

Oxime: prisms from EtOH.Aq. M.p. 75–7°. $[\alpha]_D^{17} + 19.2^\circ$. Volatile in steam.

Semicarbazone: needles from EtOH. M.p. 173–4°. $[\alpha]_D^{21} + 114.7^\circ$. Insol. H_2O .

l-.

B.p. 227–9°. n_D^{19} 1.482.

Oxime: prisms from MeOH. M.p. 75–6°. $[\alpha]_D - 19.1^\circ$ in MeOH.

Semicarbazone: needles from EtOH. M.p. 135°. $[\alpha]_D^{22} - 114^\circ$ in $CHCl_3$.

i-.

B.p. 228°. D_4^{20} 0.9351. n_D^{20} 1.4805. Ox. \longrightarrow succinic + pyruvic acids.

Oxime: cryst. from MeOH. M.p. 92–3°.

Semicarbazone: cryst. from MeOH. M.p. 177-8°.

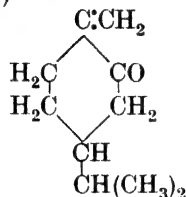
Harries, Stirm, *Ber.*, 1901, **34**, 1930.

Wallach, Beschke, *Ann.*, 1904, **336**, 35.

Vavon, *Compt. rend.*, 1911, **153**, 70.

Borgwardt, Schwenk, *J. Am. Chem. Soc.*, 1934, **56**, 1186.

$\Delta^{1(7)}$ -*p*-Menthenone-2 (5-Isopropyl-2-methyl-enecyclohexanone)



$C_{10}H_{16}O$

MW, 152

B.p. 233-5°.

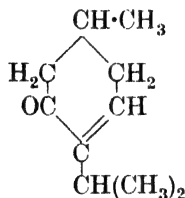
Semicarbazone: prisms + 1H₂O from EtOH.Aq. M.p. 222-3°.

Baeyer, Oehler, *Ber.*, 1896, **29**, 35.

Δ^3 -*p*-Menthenone-2.

See Carvenone.

Δ^3 -*p*-Menthenone-5 (4-Methyl-1-isopropyl-cyclohexenone-6)



$C_{10}H_{16}O$

MW, 152

Exists in three forms.

(i) B.p. 212°. D_4^{20} 0.9158. n_D 1.4731. $[\alpha]_D$ -77-97°.

Oxime: plates from EtOH. M.p. 62°. $[\alpha]_D$ -59.88° in EtOH. Volatile in steam. Sol. EtOH, Et₂O, C₆H₆.

Semicarbazone: m.p. 170-1°.

(ii)

Oxime: m.p. 63-6°.

Semicarbazone: prisms from EtOH. M.p. 171-3°.

(iii) i-. B.p. 206-8°, 95-7°/12 mm. D^{20} 0.916. n_D^{20} 1.4733.

Oxime: prisms from EtOH.Aq. M.p. 63-6°.

Semicarbazone: m.p. 142°.

Tschugajew, *Chem. Zentr.*, 1904, **I**, 1347.

Wallach, *Ann.*, 1899, **305**, 272.

Urban, Kremers, *Am. Chem. J.*, 1894, **16**, 396.

Diet. of Org. Comp.—II.

$\Delta^4(8)$ -*p*-Menthenone-3.

See Pulegone.

$\Delta^8(9)$ -*p*-Menthenone-2.

See Dihydrocarvone.

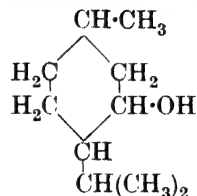
$\Delta^8(9)$ -*p*-Menthenone-3.

See Isopulegone.

Menthoglycol.

See *p*-Menthandiol-3: 8.

Menthol (*p*-Menthanol-3, 3-methyl-6-isopropyl-cyclohexanol, hexahydrothymol, menthomenthol)



$C_{10}H_{20}O$

MW, 156

l-.

Constituent of oil of peppermint. Exists in four allotropic forms. Needles from MeOH. M.p. (a), 44°, (b) 35°, (c) 33°, (d) 31°. B.p. 216°, 145°/100 mm., 111°/20 mm., 98°/10 mm. D_4^{15} 0.904, D_6^{20} 0.8835. n_D^{25} 1.458. $[\alpha]_D^{15}$ -50.1°, $[\alpha]_D^{100}$ -49.5° in EtOH. Sol. EtOH, Et₂O, AcOH, CS₂. Spar. sol. H₂O. Sol. conc. HCl. Heat of comb. C_p 1509.16 Cal. Heated in bomb tube at 450° → menthene + menthone. CrO_3 → menthone + 2-methyl-4-isobutyryl-*n*-valeric acid. HI → *p*-menthane. $KMnO_4$ → 2-methyl-4-isobutyryl-*n*-valeric acid + formic, propionic, butyric, oxalic, and 2-methyladipic acids. PCl_5 → menthyl chloride. Dil. H₂SO₄ at 60° → Δ^3 -*p*-menthene. Conc. H₂SO₄ → menthane + *p*-cymene + a comp. C₂₀H₃₆, b.p. 190-1°/20 mm.

Me ether: methyl 3-*p*-menthyl ether. C₁₁H₂₂O. MW, 170. D_4^{20} 0.8607. $[\alpha]_D$ -95.67°.

Et ether: ethyl 3-*p*-menthyl ether. C₁₂H₂₄O. MW, 184. B.p. 211-12°, 103-4°/24 mm. D_4^{20} 0.8537. n_D^{17} 1.4434. $[\alpha]_D^{20}$ -98.32°.

Propyl ether: C₁₃H₂₆O. MW, 198. D_4^{20} 0.8519. $[\alpha]_D$ -92.4°.

Allyl ether: C₁₃H₂₄O. MW, 196. B.p. 103-4°/13 mm. D_4^{20} 0.8763. $[\alpha]_D$ -98.3°.

Methylene ether: dimenthoformal. C₂₁H₄₀O₂. MW, 324. Needles. M.p. 57°. B.p. 337°. $[\alpha]_D^{24}$ -77.9° in EtOH. Sol. EtOH, Et₂O, C₆H₆. Insol. H₂O.

d-β-Glucoside: prisms + H₂O from H₂O. M.p. 77-9°. $[\alpha]_D^{20}$ -93° in EtOH. Sol. EtOH. Spar. sol. H₂O, AcOEt, Et₂O, C₆H₆. Insol. pet. ether. *Tetra-acetyl deriv.*: needles from 50% EtOH. M.p. 130°. Sol. Et₂O, Me₂CO. Spar. sol. H₂O. Insol. pet. ether.

Formyl: m.p. 9°. B.p. 219°, 98°/15 mm. D_4^{20} 0.9359. $[\alpha]_D^{20} - 79.52^\circ$.
Acetyl: b.p. 227°, 116°/22 mm., 109°/10 mm. D_4^{20} 0.9185. $[\alpha]_D^{20} - 77.6^\circ$.
Chloroacetyl: needles from EtOH. M.p. 38°. D_4^{20} 1.0564. $[\alpha]_D - 73.86^\circ$.
Dichloroacetyl: b.p. 173°/37 mm. D_4^{20} 1.1088. $[\alpha]_D - 63.56^\circ$.
Trichloroacetyl: b.p. 149°/10 mm. D_4^{20} 1.1796. $[\alpha]_D - 59.65^\circ$.
Bromoacetyl: b.p. 144-5°/12 mm. D_4^{20} 1.2136. $[\alpha]_D^{25} - 61.98^\circ$.
Iodoacetyl: b.p. 165°/22 mm. $[\alpha]_D^{20} - 47.29^\circ$.
Propionyl: b.p. 118°/15 mm. D_4^{20} 0.9184. $[\alpha]_D^{20} - 75.5^\circ$.
n-Butyryl: b.p. 129°/15 mm. D_4^{20} 0.9114. $[\alpha]_D^{20} - 70.56^\circ$.
Isobutyryl: b.p. 116-17°/12 mm. D_4^{20} 0.9062. $[\alpha]_D^{20} - 72^\circ$.
n-Valeryl: b.p. 141°/15 mm. D_4^{20} 0.9074. $[\alpha]_D^{20} - 65.55^\circ$.
Isovaleryl: validol. B.p. 129°/9 mm. D_4^{15} 0.9067. n_D^{20} 1.4485. $[\alpha]_D^{20} - 64.62^\circ$. Used as a prophylactic accessory.
Caproyl: b.p. 153°/15 mm. D_4^{20} 0.9033. $[\alpha]_D^{20} - 62.07^\circ$.
Heptyl: b.p. 165°/15 mm. D_4^{20} 0.9006. $[\alpha]_D^{20} - 58.85^\circ$.
Caprylyl: b.p. 175°/15 mm. D_4^{20} 0.8977. $[\alpha]_D^{20} - 55.25^\circ$.
Stearyl: m.p. 39°. $[\alpha]_D^{20} - 36.7^\circ$ in EtOH.
Crotonyl: b.p. 140°/14 mm. D_4^{20} 0.8325. $[\alpha]_D^{20} - 90.67^\circ$.
Allylacetyl: b.p. 139-40°/14 mm. $[\alpha]_D^{20} - 67.32^\circ$.
2-Ethylacrylyl: b.p. 152-3°/14 mm. $[\alpha]_D^{25} - 74.4^\circ$.
Sorbyl: b.p. 173°/14 mm. $[\alpha]_D^{20} - 83.17^\circ$.
Oxalyl: m.p. 68°. B.p. 225°/12 mm. $[\alpha]_D^{15} - 104^\circ$.
Malonate: see under Malonic Acid.
Acid succinate: cryst. from EtOH. M.p. 62°. $[\alpha]_D^{20} - 59.63^\circ$ in C_6H_6 . Sol. EtOH, Et_2O . Spar. sol. H_2O .
Succinate: cryst. from EtOH. M.p. 63°. $[\alpha]_D^{15} - 81.52^\circ$ in C_6H_6 .
Glutarate: b.p. 240-3°/20 mm. $[\alpha]_D^{15} - 80.26^\circ$ in $CHCl_3$.
Adipate: needles from pet. ether. M.p. 61°. $[\alpha]_D^{15} - 83.8^\circ$ in $CHCl_3$.
Pimelate: b.p. 248-52°/20 mm. $[\alpha]_D^{15} - 78.31^\circ$ in $CHCl_3$.
Suberate: m.p. 38-9°. B.p. 257-9°/20 mm. $[\alpha]_D^{15} - 73.56^\circ$ in $CHCl_3$.
Azelate: b.p. 254°/20 mm. $[\alpha]_D^{15} - 72.68^\circ$ in $CHCl_3$.

Sebacate: b.p. 256-8°/20 mm. $[\alpha]_D^{15} - 67.08^\circ$ in $CHCl_3$.

Mucate: cryst. from MeOH. M.p. 168°. $[\alpha]_D^{15} - 93.4^\circ$.

Carbonate: leaflets from EtOH. M.p. 106°. $[\alpha]_D^{20} - 92.52^\circ$ in C_6H_6 . Sol. Et_2O , C_6H_6 . Spar. sol. EtOH.

Carbamate: "mentholurethane." Prisms from EtOH. M.p. 161°. Sol. MeOH, AcOH, CS_2 , C_6H_6 . Spar. sol. H_2O . $[\alpha]_D^{21} - 85.11^\circ$ in $CHCl_3$. Decomp. at 200° → cyanuric acid. Alc. KOH → menthane + KCNO.

Monothiocarbamate: "l-menthylxanthogenamide." Prisms from EtOH- Et_2O . M.p. 144-5°. $[\alpha]_D - 120.8^\circ$ in C_6H_6 . Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. pet. ether.

Glycollate: needles from EtOH. M.p. 87°. Sol. most org. solvents. Spar. sol. H_2O .

Methoxyacetyl: b.p. 140°/10 mm.

Ethoxyacetyl: b.p. 153°/20 mm.

d-Tartrate: needles from EtOH. M.p. 74-5°. D_4^{20} 1.054. $[\alpha]_D^{20} - 66.63^\circ$. *Diacetyl*: cryst. from EtOH. M.p. 84-5°, solidifying and remelting at 108°. D_4^{14} 1.05. $[\alpha]_D^{18} - 52.83^\circ$ in EtOH.

l-Tartrate: needles from pet. ether. M.p. 42°. D_4^{16} 1.045. $[\alpha]_D^{14} - 75.64^\circ$ in EtOH. *Diacetyl*: cryst. from MeOH.Aq. M.p. 102.5°. D_4^{16} 1.055. $[\alpha]_D^{20} - 72.21^\circ$ in EtOH.

Mesotartrate: *diacetyl*, cryst. from MeOH. M.p. 129°. D_4^{30} 0.9683. $[\alpha]_D^{15} - 57.2^\circ$ in EtOH.

Pyruvate: b.p. 136-40°/22 mm. D_4^{20} 0.9852. $[\alpha]_D^{15} - 181.7^\circ$.

Acetoacetate: m.p. 30-2°. B.p. 145°/11 mm. D_4^{15} 0.986. $[\alpha]_D^{20} - 70.1^\circ$ in EtOH. Sol. EtOH, Et_2O , $CHCl_3$, CS_2 . Insol. H_2O . Exhibits mutarotation. *Semicarbazone*: needles from EtOH. M.p. 143-4°. $[\alpha]_D - 56.1^\circ$ in C_6H_6 . Sol. EtOH, Me_2CO , AcOEt, C_6H_6 . Spar. sol. Et_2O . Spar. sol. pet. ether.

Levulinate: b.p. 169°/12 mm. D_4^{20} 0.9773. $[\alpha]_D^{20} - 60.6^\circ$ in C_6H_6 .

Allophanate: needles from EtOH. M.p. 215°.

Benzoyl: m.p. 55°.

Cinnamoyl: b.p. 230-3°/27 mm. D_4^{20} 1.0066. n_D^{17} 1.5433. $[\alpha]_D^{20} - 76.95^\circ$ in C_6H_6 .

Acid phthalate: (i) labile form, m.p. 110°. (ii) Stable form, m.p. 122°.

Phenylurethane: m.p. 112°.

d-.

M.p. 38-40°. $[\alpha]_D + 48.3^\circ$ in EtOH.

Benzoyl: m.p. 2°.

dl-.

Needles from pet. ether. M.p. 34°. B.p. 216°, 103-5°/16 mm. D_4^{15} 0.904. n_D^{20} 1.4615.

Sol. most org. solvents. Insol. H_2O . Ox. \rightarrow *dl*-menthone.

Phenylurethane: m.p. 104°.

Acid succinate: needles from pet. ether. M.p. 85°.

Acid phthalate: m.p. 130°.

Beckmann, *J. prakt. Chem.*, 1897, **55**, 14.

Kondakow, Bachtshiew, *J. prakt. Chem.*, 1901, **63**, 56.

Tschugajew, *Ber.*, 1898, **31**, 364; *Chem. Zentr.*, 1902, II, 1238; 1904, I, 1347.

Pickard, Littlebury, *J. Chem. Soc.*, 1912, **101**, 111.

Oppenheim, *Ann.*, 1861, **120**, 351.

Fischer, Raske, *Ber.*, 1909, **42**, 1470.

Hilditch, *J. Chem. Soc.*, 1909, **95**, 1579.

Cohen, *J. Chem. Soc.*, 1911, **99**, 1061.

Patterson *et al.*, *J. Chem. Soc.*, 1906, **89**, 333, 1889.

Lapworth, Hann, *J. Chem. Soc.*, 1902, **81**, 1501.

Mentholurethane.

See under Menthol.

Menthomenthene.

See Δ^3 -*p*-Menthene.

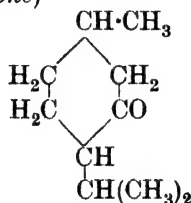
Menthomenthol.

See Menthol.

Menthonaphthene.

See *p*-Menthane.

Menthone (*p*-Menthanone-3, 3-methyl-6-*isopropylcyclohexanone*)



$C_{10}H_{18}O$

MW, 154

l-.

Occurs with menthol in American peppermint oil, geranium oil, etc. Liq. with odour of peppermint. M.p. -6° . B.p. 207°, 137°/100 mm., 96°/20 mm., 81°/10 mm. D_4^{20} 0.8954, D_4^{130} 0.8073. n_D^{20} 1.4505. $[\alpha]_D^{20} = 24.8^\circ$. Misc. with most org. solvents. Spar. sol. H_2O . Slowly inverts to *d*-isomenthone. Conc. acids accelerate this inversion. $KMnO_4 \rightarrow d$ -2-methyladipic acid. Red. $\rightarrow l$ -menthol. $P_2S_5 \rightarrow \Delta^3$ -*p*-menthene. $HI + P \rightarrow p$ -menthane.

Oxime: cryst. M.p. 59–60°. Triboluminescent. B.p. 250–1°. $[\alpha]_D = 4.16^\circ$ in EtOH. More stable towards inverting agents than *l*-menthone. Red. $\rightarrow l$ -menthylamine. $NaNO_2 \rightarrow$ a per-nitroso deriv. (decomp. at 130° in

vacuo). $P_2O_5 \rightarrow$ menthonitrile. *Benzoyl*: m.p. 54°. *B.HCl*: needles from EtOH. M.p. 118–10°.

Hydrazone: b.p. 248–9°, 144°/30 mm. D_4^{20} 0.9333. n_D 1.4940. $[\alpha]_D = 52.4^\circ$. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O .

Azine: *l*-menthazine. Needles from MeOH. M.p. 51°. B.p. 218°/40 mm. $[\alpha]_D = 107.68^\circ$ in EtOH.

Semi-oxamazone: needles from EtOH. M.p. 177°. Insol. H_2O , EtOH. Decomp. by boiling H_2O .

Semicarbazone: prisms. M.p. 185–7°. $[\alpha]_D = 64^\circ$ in chloral hydrate. Spar. sol. EtOH. Insol. H_2O .

Thiosemicarbazone: needles from EtOH. M.p. 155–7°.

Phenylsemicarbazone: needles from EtOH. M.p. 180–1°.

d-.

B.p. 204°. D_{18}^{18} 0.895°. $[\alpha]_D^{18} = +24.85^\circ$.

Oxime: m.p. 59°.

Semicarbazone: m.p. 187–9°.

dl. Thymomenthone.

Liq. with odour of peppermint. B.p. 205° (212°). D^0 0.911. Sol. EtOH, Et_2O , AcOH. Spar. sol. H_2O . $H(+Ni) \rightarrow dl$ -menthol + *dl*-neomenthol. Red. with Na $\rightarrow dl$ -menthol.

Oxime: needles from EtOH. M.p. 80° (81–2°).

Semicarbazone: needles from MeOH. M.p. 158°.

Sandborn, *Organic Syntheses*, 1932, Collective, Vol. I, 333.

Ciamician, Silber, *Ber.*, 1909, **42**, 1510.

Tutin, Kipping, *J. Chem. Soc.*, 1904, **85**, 66.

Wallach, Tuttle, *Ann.*, 1893, **277**, 157.

Kishner, *Chem. Zentr.*, 1908, I, 1178.

Pickard, Littlebury, *J. Chem. Soc.*, 1912, **101**, 110.

Brunel, *Compt. rend.*, 1905, **140**, 793.

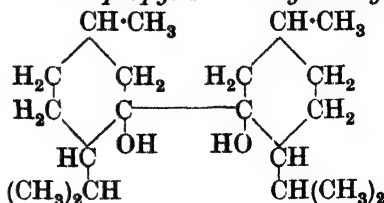
Menthone-carboxylic Acid.

See *p*-3-Menthane-4-carboxylic Acid and *p*-3-Menthane-8-carboxylic Acid.

Menthonol.

Menthanolone, *q.v.*

Menthopinacone (1:1'-*Dihydroxy*-3:3'-*dimethyl*-5:5'-*diisopropyl*-1:1'-*dicyclohexyl*)



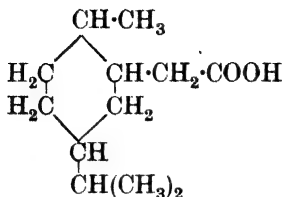
$C_{20}H_{38}O_2$

MW, 310

Needles. M.p. 94°. $[\alpha]_D^{20} - 0.48^\circ$ in EtOH.

Beckmann, *J. prakt. Chem.*, 1897, **55**, 22.

2-*p*-Menthylacetic Acid (*Menthane-2-acetic acid*)



$C_{12}H_{22}O_2$

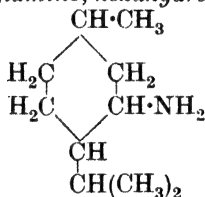
MW, 198

B.p. 162–6°/12 mm.

Et ester: $C_{14}H_{26}O_2$. MW, 226. B.p. 125–6°/12 mm. $D_4^{25} 0.9253$. $n_D^{25} 1.4651$. $[\alpha]_{5461}^{25} +7.2^\circ$. *p-Toluidide*: $C_{19}H_{29}O_2N$. MW, 303. Needles from EtOH. M.p. 133°.

Bradfield, Jones, Simonsen, *J. Chem. Soc.*, 1934, 1811.

Menthylamine (*3-Aminomenthane, 3-amino-1-methyl-4-isopropyl-cyclohexane, 3-methyl-6-isopropylcyclohexylamine, hexahydrothymylamine*)



$C_{10}H_{21}N$

MW, 155

Exists in several enantiomorphous forms (neomenthylamine, isomenthylamine, neoisomenthylamine).

l.

B.p. 212°. $D_4^{17} 0.8567$. $[\alpha]_D^{19} - 34.20^\circ$.

B, HCl: needles from H_2O . M.p. above 280°. $[\alpha]_D - 36.6^\circ$ in H_2O .

B, HClO3: needles. M.p. 168°.

B4, H4Fe(CN)6: needles from EtOH. De-comp. on heating without melting. $[\alpha]_D^{17} - 42.4^\circ$ in EtOH.

Formyl: m.p. 102–3°. $[\alpha]_D - 83.8^\circ$ in $CHCl_3$.

Acetyl: m.p. 145°. $[\alpha]_D - 81.7^\circ$ in $CHCl_3$.

Benzoyl: m.p. 157°. $[\alpha]_D - 62.8^\circ$ in $CHCl_3$.

2-Naphthalene-sulphonyl: m.p. 135°. $[\alpha]_D - 53.3^\circ$ in $CHCl_3$.

Benzylidene: m.p. 69–70°. $[\alpha]_D - 132.5^\circ$ in $CHCl_3$.

Salicylidene: m.p. 57–8°. $[\alpha]_D - 119.2^\circ$ in $CHCl_3$.

Carbamide: m.p. 134–6°.

Phenylcarbamide: m.p. 140–1°.

Phenylthiocarbamide: m.p. 135°.

dl.

B.p. 208°. Volatile in steam.

B, HCl: needles from MeOH– Me_2CO . M.p. above 250°.

B2, H2PtCl6: prisms from H_2O . M.p. 201–2°.

Picrate: yellow prisms from MeOH. M.p. 196–8°.

Formyl: prisms from pet. ether. M.p. 77–8°.

Acetyl: needles from Et_2O –pet. ether. M.p. 123°.

Benzoyl: prisms from MeOH. M.p. 145–6°.

2-Naphthalene-sulphonyl: m.p. 145–6°.

Carbamide: needles from Me_2CO . M.p. 157°.

Phenylcarbamide: needles from MeOH. M.p. 162°.

Phenylthiocarbamide: prisms from MeOH. 151°.

Read, Cook, Shannon, *J. Chem. Soc.*, 1926, 2226.

Read, Robertson, *J. Chem. Soc.*, 1927, 2169.

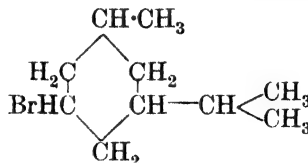
Read, *Chemical Reviews*, 1930, **7**, 21.

Wallach, *Ann.*, 1893, **276**, 306; 1898, **300**, 278; 1913, **397**, 218.

Mailhe, Murat, *Bull. soc. chim.*, 1911, **9**, 467.

Tutin, Kipping, *J. Chem. Soc.*, 1904, **85**, 65.

sym.-Menthyl bromide (*5-Bromo-m-menthane, 5-bromo-1-methyl-3-isopropylcyclohexane*)



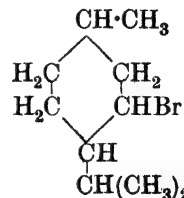
$C_{10}H_{19}Br$

MW, 219

B.p. 104–6°/12 mm. $D_4^{15} 1.1992$.

Knoevenagel, *Ann.*, 1897, **297**, 171.

sec.-Menthyl bromide (*3-Bromo-p-menthane, 3-bromo-1-methyl-4-isopropylcyclohexane*)



$C_{10}H_{19}Br$

MW, 219

Exists in two forms.

α .

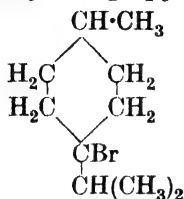
B.p. 98–9°/14 mm. $D_4^{20} 1.1504$. $[\alpha]_D - 10.45^\circ$.

β -.

B.p. 106–7°/20 mm. D_4^{20} 1.1557. $[\alpha]_D -23.75^\circ$.

Kurssanow, *Chem. Zentr.*, 1923, III, 1074.

tert.-Menthyl bromide (4-Bromo-p-menthane, 4-bromo-1-methyl-4-isopropylcyclohexane)

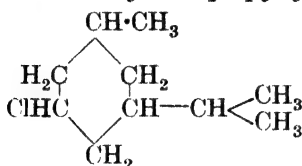


$C_{10}H_{19}Br$ MW, 219

B.p. 98–9°/11 mm. D_4^{20} 1.165. n_D^{20} 1.4872.

Kondakow, Schindelmeyer, *J. prakt. Chem.*, 1903, 67, 195, 344.

sym.-Menthyl chloride (5-Chloro-m-menthane, 5-chloro-1-methyl-3-isopropylcyclohexane)

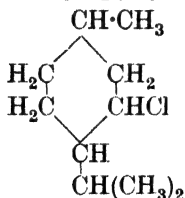


$C_{10}H_{19}Cl$ MW, 174.5

B.p. 94–6°/12 mm. D_4^{14} 0.9720.

Knoevenagel, *Ann.*, 1897, 297, 171.

sec.-Menthyl chloride (3-Chloro-p-menthane, 3-chloro-1-methyl-4-isopropylcyclohexane)



$C_{10}H_{19}Cl$ MW, 174.5

Exists in two forms.

α -.

B.p. 209–10°, 108–10°/30 mm., 87–90°/13 mm. D_{15}^{15} 0.947. $[\alpha]_D^{20} -9.3^\circ$. Heated with KOAc, $C_6H_5\cdot NH_2$ or alc. KOH $\rightarrow \Delta^3$ -p-menthene + β -form.

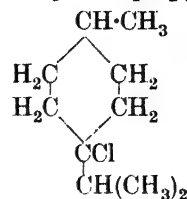
β -.

B.p. 213–14°/738 mm., 94–5°/15 mm. D_4^{20} 0.8385. n_D^{20} 1.4642. $[\alpha]_D -51.55^\circ$.

Kurssanow, *Ann.*, 1901, 318, 328; *Chem. Zentr.*, 1915, I, 893.

Tschugajew, *Chem. Zentr.*, 1904, I, 1348. Slavinski, *Chem. Zentr.*, 1897, I, 1058.

tert.-Menthyl chloride (4-Chloro-p-menthane, 4-chloro-1-methyl-4-isopropylcyclohexane)



$C_{10}H_{19}Cl$ MW, 174.5

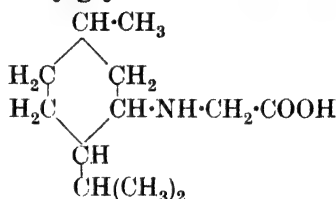
B.p. 86–8°/14 mm. Decomp. on dist. at 760 mm. D_4^{19} 0.9479. n_D^{19} 1.4655. Boiling $H_2O \rightarrow \Delta^3$ -p-menthene.

Kurssanow, *Chem. Zentr.*, 1923, III, 1074.

Auwers, *Ber.*, 1909, 42, 4906.

Kondakow, *Ber.*, 1895, 28, 1618.

l-3-Menthylglycine



$C_{12}H_{23}O_2N$ MW, 213

Prisms from H_2O . M.p. 191°. $[\alpha]_D -61.5^\circ$ in $CHCl_3$. Sol. hot H_2O . At m.p. \rightarrow N-methyl-l-menthylamine + CO_2 .

Et ester: $C_{14}H_{27}O_2N$. MW, 241. B.p. 139°/10 mm. $[\alpha]_D -56.1^\circ$ in $CHCl_3$. n_D^{15} 1.4642.

l-Menthyl ester: $C_{22}H_{41}O_2N$. MW, 351. Prisms from MeOH. M.p. 63°. $[\alpha]_D^{19.5} -105.3^\circ$ in $CHCl_3$. N-Acetyl: $[\alpha]_D -50.9^\circ$ in $CHCl_3$. n_D^{15} 1.4821. N-Benzoyl: prisms from MeOH. M.p. 96°. $[\alpha]_D -60.8^\circ$ in $CHCl_3$. N-p-Nitrobenzoyl: prisms from MeOH. M.p. 146°. $[\alpha]_D -51.0^\circ$ in $CHCl_3$. N-3:5-Dinitrobenzoyl: pale yellow needles from MeOH. M.p. 170°. $[\alpha]_D -23.7^\circ$ in $CHCl_3$. B, HCl: needles. M.p. 69°. $[\alpha]_D -77.7^\circ$. B_2, H_2SO_4 : needles from EtOH. M.p. 191°. $[\alpha]_D -93.0^\circ$ in $CHCl_3$. Oxalate: needles from EtOH. M.p. 168.5°. $[\alpha]_D -76.4^\circ$.

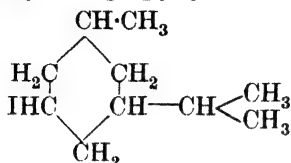
d-Menthyl ester: prisms from MeOH. M.p. 82°. $[\alpha]_D +2.0^\circ$ in $CHCl_3$. N-Acetyl: needles from MeOH. M.p. 95°. $[\alpha]_D +24.1^\circ$ in $CHCl_3$. N-Benzoyl: needles from MeOH. Aq. M.p. 106–7°. $[\alpha]_D +8.6^\circ$. N-p-Nitrobenzoyl: needles from MeOH. M.p. 146°. $[\alpha]_D +13.0^\circ$. N-3:5-Dinitrobenzoyl: needles. M.p. 131°. $[\alpha]_D +38.0^\circ$. B_2, H_2SO_4 : needles from AcOEt. M.p. 176°. $[\alpha]_D +3.7^\circ$ in $CHCl_3$.

N-Acetyl: needles from EtOH. M.p. 154°. $[\alpha]_D -43.6^\circ$ in $CHCl_3$. Mod. sol. hot H_2O . Very stable towards acids and alkalis.

N-Benzoyl: prisms from Et₂O-pet. ether. M.p. 118°. [α]_D - 73.5°. Insol. H₂O.

Clark, Read, *J. Chem. Soc.*, 1934, 1775.

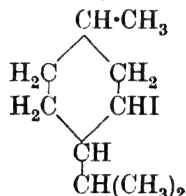
sym.-Menthyl iodide (5-Iodo-m-menthane, 5-iodo-1-methyl-4-isopropylcyclohexane)



C₁₀H₁₉I MW, 266
B.p. 133-4°/12 mm. D₄¹⁵ 1.4016.

Knoevenagel, *Ann.*, 1897, 297, 171.

sec.-Menthyl iodide (3-Iodo-p-menthane, 3-iodo-1-methyl-4-isopropylcyclohexane)



C₁₀H₁₉I MW, 266

d.

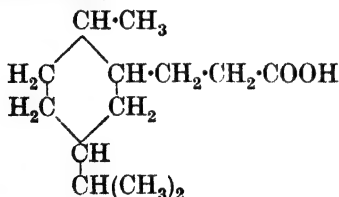
B.p. 122-3°/17 mm. D₄²⁰ 1.3586. [α]_D + 41.2°.

l.

B.p. 121-2°/17 mm. [α]_D - 27°.

Kurssanow, *Chem. Zentr.*, 1923, III, 1074.

2-p-Menthyl- β -propionic Acid (*Menthane-2- β -propionic acid*)



C₁₃H₂₄O₂ MW, 212

Et ester: C₁₅H₂₈O₂. MW, 240. B.p. 145-151°/16 mm. D₂₅²⁵ 0.9226. n_D²⁵ 1.4659. [α]₅₄₆₁ + 17.3°.

Nitrile: C₁₃H₂₃N. MW, 193. B.p. 141-6°/14 mm.

Bradfield, Jones, Simonsen, *J. Chem. Soc.*, 1934, 1812.

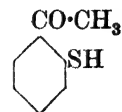
l-Menthylxanthogenamide.

See under Menthol.

Mercaptoacetic Acid.

See Thioglycolic Acid.

o-Mercaptoacetophenone (*o-Acetothio-phenol*)



C₈H₈OS MW, 152

Oil. B.p. 124-6° in vacuo. Alk. sol. in air \rightarrow thioindigo.

Semicarbazone: needles from EtOH. M.p. 235° decomp.

M.L.B., D.R.P., 198,509, (*Chem. Zentr.*, 1908, I, 2118).

ω -Mercaptoacetophenone.

See Phenacyl Mercaptan.

Mercapto-amino-propionic Acid.

See Cysteine and Isocysteine.

Mercaptaniline.

See Aminothiophenol.

Mercaptoanisole.

See under Thiocatechol, Thiohydroquinone, and Thioresorcinol.

2-Mercaptoanthracene (2-Thioanthrol)

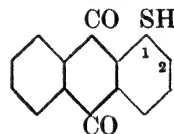


C₁₄H₁₀S MW, 210

Light yellow needles from C₆H₆. Decomp. above 220°. Sol. warm EtOH, C₆H₆, CHCl₃, AcOH. Spar. sol. Et₂O. Insol. pet. ether. Very sol. KOH. Less sol. NH₃.

Heffter, *Ber.*, 1895, 28, 2263.

1-Mercaptoanthraquinone



C₁₄H₈O₂S MW, 240

Orange prisms or yellow needles from AcOH. M.p. 187°. Sol. alc. alkalis with violet col. Spar. sol. EtOH, C₆H₆. Conc. H₂SO₄ \rightarrow red sol. Easily oxidised.

S-Me ether: methyl 1-anthraquinonyl sulphide. C₁₅H₁₀O₂S. MW, 254. Yellow needles from EtOH. M.p. 218°. Sol. C₆H₆. Mod. sol. EtOH. Spar. sol. pet. ether.

S-Et ether: ethyl 1-anthraquinonyl sulphide. C₁₆H₁₂O₂S. MW, 268. Yellow prisms from EtOH. M.p. 183°.

S-Vinyl ether: vinyl 1-anthraquinonyl sulphide. C₁₆H₁₀O₂S. MW, 266. Reddish-brown needles from EtOH. M.p. 163°.

S-Phenyl ether: phenyl 1-anthraquinonyl sulphide. $C_{20}H_{12}O_2S$. MW, 316. Orange-red needles from AcOH, yellow needles from C_6H_6 . M.p. 185°. Sol. EtOH, C_6H_6 . Sublimes easily.

S-o-Tolyl ether: o-tolyl 1-anthraquinonyl sulphide. $C_{21}H_{14}O_2S$. MW, 330. Reddish-brown needles from AcOH. M.p. 216°.

S-p-Tolyl ether: p-tolyl 1-anthraquinonyl sulphide. Orange-red needles from AcOH or C_6H_6 . M.p. 226°.

S-Benzyl ether: benzyl 1-anthraquinonyl sulphide. $C_{21}H_{14}O_2S$. MW, 330. Yellow needles from AcOH. M.p. 241°.

Fries, *Ber.*, 1912, **45**, 2971.

Gattermann, *Ann.*, 1912, **393**, 119, 138.

Bayer, D.R.P., 281,102, (*Chem. Zentr.*, 1915, I, 180).

M.L.B., D.R.P., 292,457, (*Chem. Zentr.*, 1916, II, 42).

2-Mercaptoanthraquinone.

Yellow needles from AcOH. M.p. 206°. Spar. sol. usual org. solvents. Violet sols. in alkalis. Conc. $H_2SO_4 \rightarrow$ red sol.

S-Me ether: methyl 2-anthraquinonyl sulphide. Yellow needles from AcOH. M.p. 162°.

S-Et ether: ethyl 2-anthraquinonyl sulphide. Yellow needles from EtOH. M.p. 138°.

S-Vinyl ether: vinyl 2-anthraquinonyl sulphide. Yellow needles from EtOH.Aq. M.p. 133°.

S-Allyl ether: allyl 2-anthraquinonyl sulphide. $C_{17}H_{12}O_2S$. MW, 280. Yellow needles from EtOH. M.p. 126°.

S-Benzyl ether: benzyl 2-anthraquinonyl sulphide. Yellow needles from 138°.

Gattermann, *Ann.*, 1912, **393**, 119, 150.

Badische, D.R.P., 247,412, (*Chem. Zentr.*, 1912, II, 166).

Bayer, D.R.P., 281,102, (*Chem. Zentr.*, 1915, I, 180).

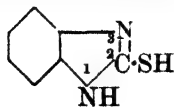
Mercaptobenzene.

See Thiophenol.

Mercaptobenzenesulphonic Acid.

See Thiophenolsulphonic Acid.

2-Mercaptobenzimidazole



$C_7H_6N_2S$

MW, 150

Plates from dil. EtOH or NH_3 .Aq. M.p. 298° (296-7°). Sol. EtOH. Less sol. H_2O .

1-N-Me: $C_8H_8N_2S$. MW, 164. M.p. 190-2°.

1-N-Phenyl: $C_{13}H_{10}N_2S$. MW, 226. M.p. 194-5°.

1-N-Benzyl: $C_{14}H_{12}N_2S$. MW, 240. M.p. 181-2°.

S-Benzyl: $C_{14}H_{12}N_2S$. MW, 240. M.p. 186-7°. Insol. alkalis.

Lellmann, *Ann.*, 1883, **221**, 9.

Billeter, Steiner, *Ber.*, 1887, **20**, 231.

I.G., D.R.P., 557,138, (*Chem. Abstracts*, 1933, **27**, 1233).

o-Mercaptobenzoic Acid.

See Thiosalicylic Acid.

m-Mercaptobenzoic Acid



$C_7H_6O_2S$

MW, 154

Plates or needles from EtOH.Aq. M.p. 146-7°. Very sol. H_2O . Sol. EtOH. In moist air \rightarrow diphenyl disulphide 3:3'-dicarboxylic acid.

S-Me: $C_8H_8O_2S$. MW, 168. Needles from EtOH.Aq. M.p. 126-7°.

Smiles, Stewart, *J. Chem. Soc.*, 1921, **119**, 1797.

p-Mercaptobenzoic Acid.

Powder. M.p. 219°. Decomp. about 250°. Spar. sol. org. solvents. Readily oxidises.

S-Me: $C_8H_8O_2S$. MW, 168. Cryst. from H_2O . M.p. 192° (190°).

S-Et: $C_9H_{10}O_2S$. MW, 182. Needles from EtOH. M.p. 146°. Sol. EtOH, Et_2O , $CHCl_3$, AcOH. Less sol. C_6H_6 . Spar. sol. pet. ether.

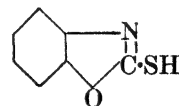
S-Phenyl: see Diphenyl sulphide 4-carboxylic Acid.

Auwers, Beger, *Ber.*, 1894, **27**, 1739.

Smiles, Harrison, *J. Chem. Soc.*, 1922, **121**, 2025.

Thompson, *J. Soc. Chem. Ind.*, 1925, **44**, 196T.

2-Mercaptobenzoxazole (Thiocarbamidophenol)

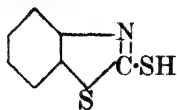


C_7H_5ONS

MW, 151

Needles from H_2O . M.p. 196° (193°). Sol. Et_2O , AcOH. Spar. sol. H_2O , EtOH. Sol. NH_3 . HCl at 170° $\rightarrow CO_2 + H_2S + o$ -aminophenol.

Kalekhoff, *Ber.*, 1883, **16**, 1825.

2-Mercaptobenzthiazole (2-Thiocarbamidothiophenol, μ -mercaptobenzthiazole) $C_7H_5NS_2$

MW, 167

Needles from MeOH.Aq. M.p. 177–9°. Spar. sol. EtOH, Et₂O, AcOH. Insol. H₂O. Sol. alkalis. Br → dibromide. Readily oxidised to its ether (*see below*). Widely used as a rubber vulcanisation accelerator.

Me ether: $C_8H_7NS_2$. MW, 181. Prisms from EtOH.Aq. M.p. 52°.

Et ether: $C_9H_9NS_2$. MW, 195. Cryst. from EtOH. M.p. 26°.

Mercaptobenzthiazyl ether: dibenzthiazyl disulphide. $C_{14}H_8N_2S_4$. MW, 332. Needles from C₆H₆. M.p. 186°. Insol. EtOH, alkalis. Rubber vulcanisation accelerator.

Rassow, Döhle, Reim, *Chem. Zentr.*, 1916, II, 394.

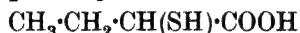
Hunter, *J. Chem. Soc.*, 1930, 137.

Jacobson, Frankenbacher, *Ber.*, 1891, 24, 1403.

Levi, *Gazz. chim. ital.*, 1931, 61, 383.

Sebrell, Boord, *J. Am. Chem. Soc.*, 1923, 45, 2397.

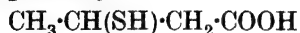
I.C.I., E.P., 335,567, (*Chem. Abstracts*, 1931, 25, 1539).

1-Mercaptobutyric Acid $C_4H_8O_2S$

MW, 120

Oil. B.p. 118–22°/19 mm. Sol. H₂O, EtOH, Et₂O.

Biilmann, *Ann.*, 1905, 339, 368.

2-Mercaptobutyric Acid $C_4H_8O_2S$

MW, 120

B.p. 110–11°/10 mm. Spar. sol. H₂O. At 100° → 2 : 2'-sulphidobutyric acid.

Lovén, Johansson, *Ber.*, 1915, 48, 1257.

Johansson, *Chem. Abstracts*, 1917, 11, 2577.

o-Mercaptocinnamic Acid (o-Thiocoumaric acid) $C_9H_8O_2S$

MW, 180

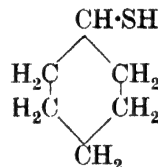
Needles from H₂O. M.p. about 165° decomp. Very sol. EtOH, AcOH. Less sol. H₂O. H₂SO₄ or Ac₂O → thiocoumarin. Alk. K₃Fe(CN)₆ → thionaphthene. NaHg → 2-mercaptohydrocinnamic acid. Lead acetate → yellow ppt.

S-Me: $C_{10}H_{10}O_2S$. MW, 194. Plates from C₆H₆ or EtOH. M.p. 176°. Sol. EtOH, AcOH. Spar. sol. H₂O.

Me ester: $C_{10}H_{10}O_2S$. MW, 194. Plates. M.p. 114°.

Lactam: *see* Thiocoumarin.

Chmielewsky, Friedländer, *Ber.*, 1913, 46, 1905.

Mercaptocyclohexane (Hexahydrothiophenol) $C_6H_{12}S$

MW, 116

Oil. B.p. 158–60° (155°). D⁰ 0.9905, D²⁰ 0.9782. n_D 1.481. Sol. EtOH, Et₂O, C₆H₆, CHCl₃, cyclohexane. Insol. H₂O. Volatile in steam.

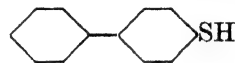
Sabatier, Mailhe, *Compt. rend.*, 1910, 150, 1220.

Mailhe, Murat, *Bull. soc. chim.*, 1910, 7, 288.

Borsche, Lange, *Ber.*, 1906, 39, 393.

Mercaptocymene.

See Thiocarvaerol and Thiothymol.

4-Mercaptodiphenyl (p-Xenyl mercaptan) $C_{12}H_{10}S$

MW, 186

Cryst. from EtOH. M.p. 111–12°. Sol. C₆H₆, CS₂. Less sol. EtOH, Et₂O. Volatile in steam.

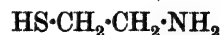
S-Me: $C_{13}H_{12}S$. MW, 200. Needles from EtOH. M.p. 107–8°.

Gabriel, Deutsch, *Ber.*, 1880, 13, 387.

Obermeyer, *Ber.*, 1887, 20, 2927.

α-Mercaptodiphenylacetic Acid.

See Thiobenzilic Acid.

2-Mercaptoethylamine (2-Aminoethyl mercaptan, thioethanolamine) C_2H_7NS

MW, 77

Cryst. M.p. 99–100°. Sol. H₂O. Oxidises in air to 2 : 2'-diaminodiethyl sulphide.

B, HCl: cryst. from EtOH. M.p. 70–2°.

Picrate: m.p. 125–6°.

Gabriel, *Ber.*, 1889, **22**, 1139.

Gabriel, Colman, *Ber.*, 1912, **45**, 1643.

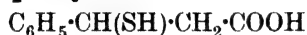
 α -Mercaptohydrocinnamic Acid

$\text{C}_9\text{H}_{10}\text{O}_2\text{S}$ MW, 182

Needles from pet. ether. M.p. 48–9° (46°).
B.p. 184–7°/11–12 mm. Sol. EtOH, Et_2O .
Mod. sol. pet. ether. Spar. sol. H_2O .

Fischer, Brieger, *Ber.*, 1914, **47**, 2477.

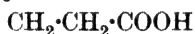
Biilmann, Madsen, *Ann.*, 1914, **402**, 339.

 β -Mercaptohydrocinnamic Acid

$\text{C}_9\text{H}_{10}\text{O}_2\text{S}$ MW, 182

Plates from H_2O . M.p. 111.5–112.5°. Very
sol. EtOH, Et_2O , Me_2CO , warm C_6H_6 , CHCl_3 .
Spar. sol. pet. ether. Almost insol. cold H_2O .
Oxidised by FeCl_3 .

Fischer, Brieger, *Ber.*, 1914, **47**, 2475.

***o*-Mercaptohydrocinnamic Acid**

$\text{C}_9\text{H}_{10}\text{O}_2\text{S}$ MW, 182

Needles from H_2O . M.p. 118°. Very sol.
hot H_2O . Sol. org. solvents.

Chmielewsky, Friedländer, *Ber.*, 1913, **46**,
1907.

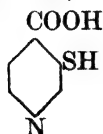
1-Mercaptoisobutyric Acid

$\text{C}_4\text{H}_8\text{O}_2\text{S}$ MW, 120

Cryst. M.p. 47°. B.p. 101–2°/15 mm. Sol.
 H_2O . k (first) = 1.26×10^{-4} ; (second) =
 0.48×10^{-11} . Ox. \longrightarrow 1:1'-disulphidoiso-
butyric acid. $\text{FeCl}_3 \longrightarrow$ indigo-blue col.

Biilmann, *Ann.*, 1906, **348**, 129.

3-Mercaptoisonicotinic Acid (3-Mercapto-
pyridine-4-carboxylic acid)



$\text{C}_6\text{H}_5\text{O}_2\text{NS}$ MW, 155

Orange-red needles. M.p. 225° decomp.
 $\text{FeCl}_3 \longrightarrow$ blue col. Alk. sols. oxidise in air.

Sucharda, Troszkiewiczówna, *Chem.*
Zentr., 1932, II, 3401.

4-Mercaptoisopentane.

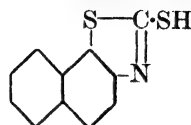
See Isoamyl Mercaptan.

***o*-Mercaptomethyl-benzoic Acid.**

See ω -Mercapto-*o*-toluic Acid.

Mercaptonaphthalene.

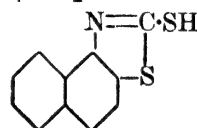
See Thionaphthol.

2-Mercapto- α -naphthathiazole

$\text{C}_{11}\text{H}_7\text{NS}_2$ MW, 217

Needles from EtOH. M.p. above 240°. Sol.
EtOH, Et_2O , AcOH, C_6H_6 . Insol. H_2O .

Jacobson, Frankenbacher, *Ber.*, 1891, **24**,
1406.

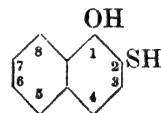
2-Mercapto- β -naphthathiazole

$\text{C}_{11}\text{H}_7\text{NS}_2$ MW, 217.

Needles from EtOH. M.p. 232° decomp. Sol.
EtOH, Et_2O , AcOH, C_6H_6 .

S-Me: $\text{C}_{12}\text{H}_9\text{NS}_2$. MW, 231. Needles from
EtOH.Aq. M.p. 73–4°. Sol. EtOH.

Jacobson, Frankenbacher, *Ber.*, 1891, **24**,
1409.

2-Mercapto-1-naphthol (1-Hydroxy-2-thio-
naphthol)

$\text{C}_{10}\text{H}_8\text{OS}$ MW, 176

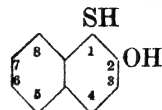
Cryst. M.p. about 100° decomp.

Lesser, Gad, *Ber.*, 1925, **58**, 2558.

5-Mercapto-1-naphthol (5-Hydroxy-1-thio-
naphthol).

Cryst. M.p. 115°. $\text{FeCl}_3 \longrightarrow$ disulphide.

Watson, Dutt, *J. Chem. Soc.*, 1922, **121**,
2416.

1-Mercapto-2-naphthol (2-Hydroxy-1-thio-
naphthol)

$\text{C}_{10}\text{H}_8\text{OS}$ MW, 176

Needles from pet. ether. M.p. 55°.

O-Me ether: $C_{11}H_{10}OS$. MW, 190. Plates from EtOH. M.p. 68°.

O-Acetyl: needles from CCl_4 . M.p. 120°.

Warren, Smiles, *J. Chem. Soc.*, 1931, 918.

Stevenson, Smiles, *J. Chem. Soc.*, 1930, 1743.

6-Mercapto-2-naphthol (6-Hydroxy-2-thionaphthol).

Plates from EtOH. M.p. 137°. Sol. EtOH, Et_2O , AcOH. Alk. sols. oxidise easily in air.

Diacetyl: needles from EtOH. M.p. 107°. Sol. EtOH, AcOH.

Zincke, Dereser, *Ber.*, 1918, 51, 357.

7-Mercapto-2-naphthol (7-Hydroxy-2-thionaphthol).

M.p. 60–70°.

Watson, Dutt, *J. Chem. Soc.*, 1922, 121, 2416.

2-Mercaptonicotinic Acid (2-Mercaptopyridine-3-carboxylic acid)



$C_6H_5O_2NS$ MW, 155

Yellow needles from EtOH.Aq. M.p. 270° decomp. Warm conc. $H_2SO_4 \rightarrow$ red sol. $FeCl_3 \rightarrow$ violet col.

Sucharda, Troszkiewiczówna, *Chem. Zentr.*, 1932, II, 3400.

6-Mercaptonicotinic Acid (6-Mercaptopyridine-3-carboxylic acid).

Yellow cryst. M.p. 272° decomp. Sol. EtOH, Et_2O . Spar. sol. cold H_2O .

Räth, *Ann.*, 1931, 487, 112.

1-Mercapto-n-pentane.

See n-Amyl Mercaptan.

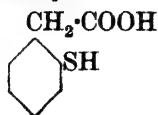
Mercaptophenetole.

See under Thiocatechol, Thiohydroquinone, and Thioresorcinol.

Mercaptophenol.

See Thiocatechol, Thiohydroquinone, and Thioresorcinol.

o-Mercaptophenylacetic Acid



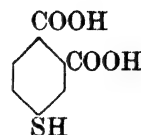
$C_8H_8O_2S$ MW, 168

Plates from H_2O or C_6H_6 -ligroin. M.p. 96–7°.

Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O , ligroin.

Marschalk, *Ber.*, 1912, 45, 1483.

4-Mercaptophthalic Acid

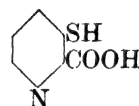


$C_8H_6O_4S$ MW, 198

Yellow cryst. M.p. 160–70°. Sol. hot H_2O , EtOH, Et_2O . Me_2CO , C_6H_6 .

Gesellschaft für chemische Industrie in Basle, D.R.P., 189,943, (*Chem. Zentr.*, 1907, II, 2094).

3-Mercaptopicolinic Acid (3-Mercaptopyridine-2-carboxylic acid)



$C_6H_5O_2NS$ MW, 155

Orange-yellow prisms from H_2O . M.p. 183.5° decomp. Alk. sols. oxidise in air. Warm conc. $H_2SO_4 \rightarrow$ red sol. $FeCl_3 \rightarrow$ blue col.

Sucharda, Troszkiewiczówna, *Chem. Zentr.*, 1932, II, 3400.

Mercaptopropane.

See Isopropyl Mercaptan and Propyl Mercaptan.

Mercaptopropionic Acid.

See Thiolactic Acid and Thiohydraacrylic Acid.

2-Mercaptopropylamine (Aminoisopropyl mercaptan)



C_3H_7NS MW, 91

Cryst. M.p. 63–5°. Sol. H_2O with strong alk. reaction. Phthalic anhydride at 150–80° \rightarrow 2-mercaptopropyl-phthalimide.

B, HCl : plates from EtOH. M.p. 87–8°.

Picrate: plates from EtOH. M.p. 143–4° decomp.

Gabriel, Leupold, *Ber.*, 1898, 31, 2838.

Gabriel, *Ber.*, 1916, 49, 1112.

Mylius, *ibid.*, 1096.

3-Mercaptopropylamine (3-Aminopropyl mercaptan)



C_3H_7NS MW, 91

Cryst. M.p. 112–13°. Sol. H_2O with strong alk. reaction.

B, HCl : needles from dil. EtOH. M.p. 69°.

B_2, H_2PtCl_6 : decomp. at 155–60°.

Gabriel, Lauer, *Ber.*, 1890, **23**, 89.

Gabriel, *Ber.*, 1916, **49**, 1113.

2-Mercaptopyridine (1-Pyridyl mercaptan)



C_5H_5NS

MW, 111

Yellowish prisms from C_6H_6 . M.p. 125°.

Marckwald, Klemm, Trabert, *Ber.*, 1900, **33**, 1556.

Räth, *Ann.*, 1931, **487**, 110.

4-Mercaptopyridine (4-Pyridyl mercaptan).

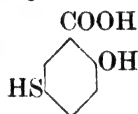
Yellow needles from EtOH. M.p. 177° decomp. Sol. H_2O , EtOH, AcOH. Mod. sol. Me_2CO , C_6H_6 , $CHCl_3$.

Chloroaurate: cryst. M.p. 210°.

Chloroplatinate: yellow cryst. M.p. above 335°.

Koenigs, Kinne, *Ber.*, 1921, **54**, 1359.

5-Mercaptosalicylic Acid



$C_7H_6O_3S$

MW, 170

Pale yellow needles from H_2O . M.p. 150–2°.

S-Me: $C_8H_8O_3S$. MW, 184. Pale buff cryst. powder from H_2O . M.p. 126°. Not oxidised by $FeCl_3$.

Stewart, *J. Chem. Soc.*, 1922, **121**, 2560.

1-Mercaptostearic Acid



$C_{18}H_{36}O_2S$

MW, 316.

Plates from AcOH or pet. ether. M.p. 80° (74°). Used in soaps as germicide.

Nicolet, Bate, *J. Am. Chem. Soc.*, 1927, **49**, 2065.

Eckert, Halla, *Monatsh.*, 1913, **34**, 1811.

Mercaptosuccinic Acid.

See Thiomalic Acid.

Mercaptotoluene.

See Thiocresol.

ω -Mercapto-*o*-toluic Acid (*Benzylmercaptan- ω -carboxylic acid*, *o*-mercaptomethyl-benzoic acid)



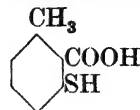
$C_8H_8O_2S$

MW, 168

Needles from H_2O . M.p. 127° decomp. At 140–50° \rightarrow thionaphthalide + H_2O .

Graebe, *Ann.*, 1888, **247**, 299.

3-Mercapto-*o*-toluic Acid (*m*-Thiocresol-2-carboxylic acid, 6-methylthiosalicylic acid)



$C_8H_8O_2S$

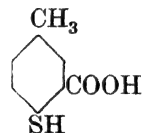
MW, 168

Cryst.

Nitrile: C_8H_7NS . MW, 149. Needles from pet. ether. M.p. 88°. Easily oxidised to the disulphide.

Hoffa, Heyna, U.S.P., 1,762,720, (*Chem. Zentr.*, 1931, II, 906).

4-Mercapto-*m*-toluic Acid (*p*-Thiocresol-3-carboxylic acid, 5-methylthiosalicylic acid, thio-*p*-cresotinic acid)



$C_8H_8O_2S$

MW, 168

Needles from C_6H_6 . M.p. 155–7°. $FeCl_3 \rightarrow$ blue col. $K_3Fe(CN)_6 \rightarrow$ disulphide.

S-Me: $C_9H_{10}O_2S$. MW, 182. Plates from C_6H_6 -pet. ether. M.p. 140–1°.

Krollpfeiffer, Schultze, Schlumbohm, Sommermeyer, *Ber.*, 1925, **58**, 1668.

Krollpfeiffer, Schultze, Sommermeyer, *ibid.*, 2698.

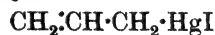
o-Mercapto-*p*-toluidine.

See 4-Amino-*o*-thiocresol.

Mercapto-xylene.

See Thioxymenol.

Mercuri-allyl iodide



C_3H_5IHg

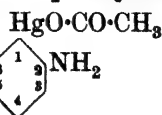
MW, 368.5

M.p. 135°. Spar. sol. cold EtOH. Insol. H_2O . $I \rightarrow$ allyliodide + mercuric iodide.

Zinin, *Ann.*, 1855, **96**, 363.

Linnemann, *Ann.*, 1866, **140**, 180.

Mercuri-*o*-aminophenyl acetate



$C_8H_9O_2NHg$

MW, 351.5

Plates from dil. EtOH. M.p. 158–60°. Sol. EtOH, AcOH, dil. min. acids.

N-Acetyl: plates from AcOH. M.p. 156–8°. Br in KBr.Aq. → *o*-bromoacetanilide.

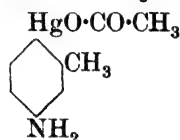
Dimroth, *Ber.*, 1902, 35, 2039.

Mercuri-*p*-aminophenyl acetate.

Prisms. M.p. 166–7°. Spar. sol. EtOH, CHCl₃. Insol. H₂O, Et₂O. Sol. dil. min. acids. N-Acetyl: needles from hot H₂O. M.p. 220–1°.

See above reference.

Mercuri-4-amino-*o*-tolyl acetate



C₉H₁₁O₂NHg MW, 365.5

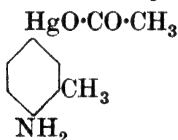
Needles. M.p. 176°.

N-Acetyl: cryst. from dil. EtOH. M.p. 99°.

Vecchiotti, *Gazz. chim. ital.*, 1924, 54, 419.

Schrauth, Schoeller, Rother, *Ber.*, 1912, 45, 2814.

Mercuri-4-amino-*m*-tolyl acetate



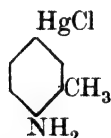
C₉H₁₁O₂NHg MW, 365.5

M.p. 129–30°.

N-Acetyl: m.p. 212–13°.

Vecchiotti, Copertini, *Gazz. chim. ital.*, 1929, 59, 540.

Mercuri-4-amino-*m*-tolyl chloride



C₇H₈NClHg MW, 342

Needles from EtOH. M.p. 178°.

N-Diacetyl: m.p. 170°.

Schrauth, Schoeller, Rother, *Ber.*, 1912, 45, 2811.

Mercuri-*n*-amyl acetate

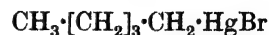


C₇H₁₄O₂Hg MW, 330.5

Prisms. M.p. 52°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, 120, 296.

Mercuri-*n*-amyl bromide



C₅H₁₁BrHg MW, 351.5

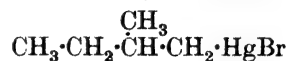
Cryst. from EtOH. M.p. 127° (122.2–122.4°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, 55, 4207.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, 47, 3011.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, 120, 277.

Mercuri-*active*-amyl bromide



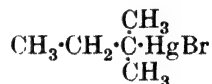
C₅H₁₁BrHg MW, 351.5

dl-.

Plates from EtOH. M.p. 119°.

Jones, Evans, Gulwell, Griffiths, *J. Chem. Soc.*, 1935, 40.

Mercuri-*tert*.-amyl bromide

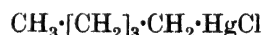


C₅H₁₁BrHg MW, 351.5

M.p. 82°.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, 45, 822.

Mercuri-*n*-amyl chloride



C₅H₁₁ClHg MW, 307

Plates from EtOH. M.p. 110°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, 120, 277.

Mercuri-*n*-amyl cyanide

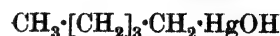


C₆H₁₁NHg MW, 297.5

Needles from dil. MeOH. M.p. 39°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, 120, 295.

Mercuri-*n*-amyl hydroxide



C₅H₁₂OHg MW, 288.5

M.p. 50°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, 120, 286.

Mercuri-n-amyl iodide**Mercuri-n-amyl iodide**

$\text{CH}_3 \cdot [\text{CH}_2]_3 \cdot \text{CH}_2 \cdot \text{HgI}$
 $\text{C}_5\text{H}_{11}\text{IHg}$ MW, 398.5

Plates from EtOH. M.p. 110°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 278.

Jones, Evans, Gulwell, Griffiths, *J. Chem. Soc.*, 1935, 40.

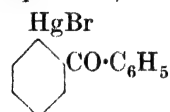
Mercuri-active-amyl iodide

$\text{CH}_3 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \text{HgI}$
 $\text{C}_5\text{H}_{11}\text{IHg}$ MW, 398.5

dl.

Plates from EtOH. M.p. 128°.

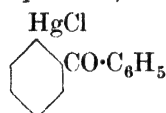
See second reference above.

Mercuri-o-benzoylphenyl bromide (o-Mercuribromobenzophenone)

$\text{C}_{13}\text{H}_9\text{OBrHg}$ MW, 461.5

Cryst. M.p. 176°. Spar. sol. EtOH, Et₂O. Br → o-bromobenzophenone.

Dimroth, *Ber.*, 1902, **35**, 2868.

Mercuri-o-benzoylphenyl chloride (o-Mercurichlorobenzophenone)

$\text{C}_{13}\text{H}_9\text{OClHg}$ MW, 417

Plates from EtOH. M.p. 167—8°. Sol. Me₂CO, CHCl₃, AcOEt. Spar. sol. ligroin. HCl → benzophenone + mercuric chloride.

Dimroth, *Ber.*, 1902, **35**, 2868.

Grignard, Abelman, *Bull. soc. chim.*, 1916, **19**, 20.

Mercuri-benzyl acetate

$\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \text{HgO} \cdot \text{CO} \cdot \text{CH}_3$
 $\text{C}_9\text{H}_{10}\text{O}_2\text{Hg}$ MW, 350.5

Needles. M.p. 126°.

Wolff, *Ber.*, 1913, **46**, 66.

Mercuri-benzyl bromide

$\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \text{HgBr}$
 $\text{C}_7\text{H}_7\text{BrHg}$ MW, 371.5

Plates. M.p. 119°.

Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.

See also previous reference.

573

Mercuri-3-bromo-4-aminophenyl acetate**Mercuri-benzyl chloride**

$\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \text{HgCl}$
 $\text{C}_7\text{H}_7\text{ClHg}$ MW, 327

Plates from EtOH-xylene. M.p. 104°.

Wolff, *Ber.*, 1913, **46**, 66.

Hilpert, Grüttner, *Ber.*, 1915, **48**, 913.

Mercuri-benzyl cyanide

$\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \text{HgCN}$
 $\text{C}_8\text{H}_7\text{NHg}$ MW, 317.5

Needles. M.p. 124°.

Wolff, *Ber.*, 1913, **46**, 66.

Mercuri-benzyl iodide

$\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \text{HgI}$
 $\text{C}_7\text{H}_7\text{IHg}$ MW, 418.5

Plates. M.p. 177°.

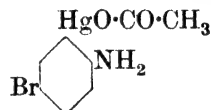
See previous reference.

Mercuri-benzyl nitrate

$\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \text{HgNO}_3$
 $\text{C}_7\text{H}_7\text{O}_3\text{NHg}$ MW, 353.5

Needles from Et₂O. M.p. 90—1° decomp.

Johns, Peterson, Hixon, *J. Am. Chem. Soc.*, 1930, **52**, 2821.

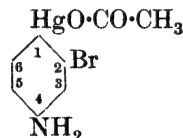
Mercuri-5-bromo-2-aminophenyl acetate

$\text{C}_8\text{H}_8\text{O}_2\text{NBrHg}$ MW, 430.5

M.p. 194°. Sol. EtOH, AcOH. Insol. H₂O.

N-Acetyl: m.p. 204°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 237.

Mercuri-2-bromo-4-aminophenyl acetate

$\text{C}_8\text{H}_8\text{O}_2\text{NBrHg}$ MW, 430.5

M.p. 181°. Sol. EtOH, AcOH. Insol. H₂O.

N-Acetyl: m.p. 215°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 187.

Mercuri-3-bromo-4-aminophenyl acetate

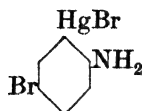
M.p. 152—3°.

N-Acetyl: m.p. 220—1°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 242.

Mercuri-5-bromo-2-aminophenyl bromide

574

Mercuri-*n*-butyl bromide**Mercuri-5-bromo-2-aminophenyl bromide** $C_6H_5NBr_2Hg$

MW, 451.5

Decomp. at 194°.

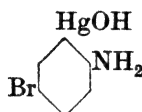
Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 238.**Mercuri-2-bromo-4-aminophenyl bromide** $C_6H_5NBr_2Hg$

MW, 451.5

M.p. 215°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 187.**Mercuri-3-bromo-4-aminophenyl bromide.**

M.p. 213–14°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 243.**Mercuri-5-bromo-2-aminophenyl hydroxide** $C_6H_5ONBrHg$

MW, 388.5

Cryst. from EtOH. M.p. 180°.

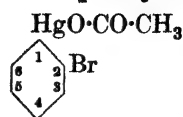
Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 237.**Mercuri-2-bromo-4-aminophenyl hydroxide** $C_6H_5ONBrHg$

NW, 388.5

M.p. 170°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 187.**Mercuri-3-bromo-4-aminophenyl hydroxide.**

M.p. 253–4°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 242.***o*-Mercuribromobenzophenone.**See Mercuri-*o*-benzoylphenyl bromide.**Mercuri-*o*-bromophenyl acetate** $C_8H_7O_2BrHg$

MW, 415.5

Cryst. from C_6H_6 . M.p. 124°.Hanke, *J. Am. Chem. Soc.*, 1923, **45**, 1328.**Mercuri-*m*-bromophenyl acetate.**

Cryst. M.p. 160°.

See previous reference.

Mercuri-*p*-bromophenyl acetate.Cryst. M.p. 196° (188°). Conc. $HNO_3 \rightarrow$ *p*-bromonitrobenzene.Hanke, *J. Am. Chem. Soc.*, 1923, **45**, 1327.Seide, Scherlin, Bras, *J. prakt. Chem.*, 1933, **138**, 67.König, Scharnbeck, *J. prakt. Chem.*, 1930, **128**, 169.**Mercuri-*o*-bromophenyl chloride** $C_6H_4ClBrHg$

MW, 392

M.p. 155°. Part. sublimes at 100°. Br in AcOH \rightarrow *o*-dibromobenzene.Hanke, *J. Am. Chem. Soc.*, 1923, **45**, 1328.**Mercuri-*m*-bromophenyl chloride.**M.p. 198°. Br in AcOH \rightarrow *m*-dibromobenzene.

See previous reference.

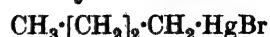
Mercuri-*p*-bromophenyl chloride.

M.p. 250° (235°).

Hanke, *J. Am. Chem. Soc.*, 1923, **45**, 1327.König, Scharnbeck, *J. prakt. Chem.*, 1930, **128**, 169.Nesmejanov, *Ber.*, 1929, **62**, 1016.**Mercuri-*n*-butyl acetate** $C_6H_{12}O_2Hg$

MW, 316.5

Prisms. M.p. 56°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.**Mercuri-*n*-butyl bromide** C_4H_9BrHg

MW, 337.5

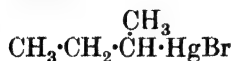
Cryst. from EtOH. M.p. 136°, (130°, 128°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 156.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 276.

Mercuri-*sec.*-butyl bromide



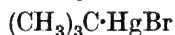
$\text{C}_4\text{H}_9\text{BrHg}$ MW, 337.5

Cryst. from EtOH. M.p. 39°.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 821.

Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.

Mercuri-*tert.*-butyl bromide

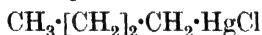


$\text{C}_4\text{H}_9\text{BrHg}$ MW, 337.5

M.p. 106° decomp.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 822.

Mercuri-*n*-butyl chloride



$\text{C}_4\text{H}_9\text{ClHg}$ MW, 293

Cryst. from EtOH. M.p. 130° (125.5°).

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 156.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 276.

Mercuri-*sec.*-butyl chloride

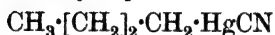


$\text{C}_4\text{H}_9\text{ClHg}$ MW, 293

Cryst. from EtOH. M.p. 30.5°.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 821.

Mercuri-*n*-butyl cyanide

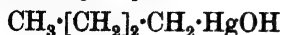


$\text{C}_5\text{H}_9\text{NHg}$ MW, 283.5

Needles from dil. MeOH. M.p. 42°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 294.

Mercuri-*n*-butyl hydroxide

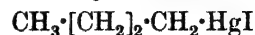


$\text{C}_4\text{H}_{10}\text{OHg}$ MW, 274.5

Cryst. from Py. M.p. 68°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 285.

Mercuri-*n*-butyl iodide



$\text{C}_4\text{H}_9\text{IHg}$ MW, 384.5

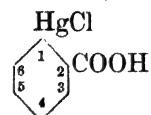
Cryst. from EtOH.Aq. M.p. 117°.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 277.

Jones, Evans, Gulwell, Griffiths, *J. Chem. Soc.*, 1935, 41.

Mercuri-*o*-carboxyphenyl chloride (*o*-Mercurichloro-benzoic acid)



$\text{C}_7\text{H}_5\text{O}_2\text{ClHg}$ MW, 357

Cryst. from hot H_2O . M.p. 253°.

Me ester: $\text{C}_8\text{H}_7\text{O}_2\text{ClHg}$. MW, 371. Needles from dil. EtOH or AcOEt. M.p. 184–5° (162°).

Insol. H_2O , pet. ether.

Et ester: $\text{C}_9\text{H}_9\text{O}_2\text{ClHg}$. MW, 385. M.p. 256°.

Pesci, *Atti accad. Lincei*, 1900, **9**, 255; 1901, **10**, 362, 413.

Schoeller, Scrauth, Heuter, *Ber.*, 1920, **53**, 636.

Nesmejanov, Makarova, *Chem. Abstracts*, 1932, **26**, 4028, 5295.

Mercuri-*m*-carboxyphenyl chloride (*m*-Mercurichlorobenzoic acid).

M.p. 264° (258°).

Me ester: m.p. 208°.

Et ester: m.p. 172°.

König, Scharnbeck, *J. prakt. Chem.*, 1930, **128**, 170.

See also last reference above.

Mercuri-*p*-carboxyphenyl chloride (*p*-Mercurichlorobenzoic acid).

M.p. 273°. Sol. EtOH. Insol. H_2O . I \longrightarrow *p*-iodobenzoic acid.

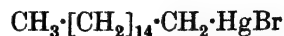
Me ester: m.p. 259°.

Et ester: m.p. 222–3°.

Michaelis, Richter, *Ann.*, 1901, **315**, 35.

Nesmejanov, Makarova, *Chem. Abstracts*, 1932, **26**, 4028, 5295.

Mercuri-*cetyl* bromide (*Mercuri-hexadecyl bromide*)

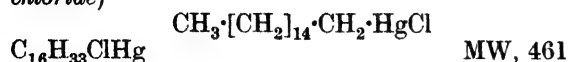


$\text{C}_{16}\text{H}_{33}\text{BrHg}$ MW, 505.5

Plates from EtOH. M.p. 101.5°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 280.

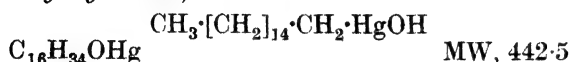
Mercuri-cetyl chloride (*Mercuri-hexadecyl chloride*)



Plates from EtOH. M.p. 102°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 281.

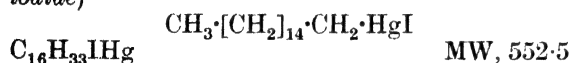
Mercuri-cetyl hydroxide (*Mercuri-hexadecyl hydroxide*)



Needles from EtOH. M.p. 78°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 287.

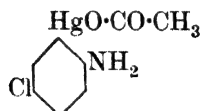
Mercuri-cetyl iodide (*Mercuri-hexadecyl iodide*)



Plates from EtOH. M.p. 82°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 281.

Mercuri-5-chloro-2-aminophenyl acetate

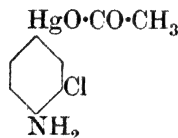


Needles. M.p. 207°. Sol. EtOH, AcOH. Insol. H_2O .

N-Acetyl: m.p. 200°.

Vecchiotti, *Gazz. chim. ital.*, 1924, **54**, 422.

Mercuri-3-chloro-4-aminophenyl acetate

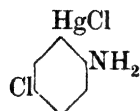


Needles from EtOH. M.p. 134°.

N-Acetyl: m.p. 238-9°.

Vecchiotti, Michetti, *Gazz. chim. ital.*, 1925, **55**, 378.

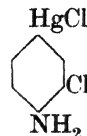
Mercuri-5-chloro-2-aminophenyl chloride



Needles. M.p. 205° decomp.

Vecchiotti, *Gazz. chim. ital.*, 1924, **54**, 424.

Mercuri-3-chloro-4-aminophenyl chloride



M.p. 174° decomp.

Vecchiotti, Michetti, *Gazz. chim. ital.*, 1925, **55**, 379.

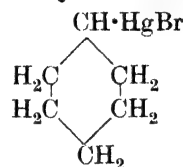
Mercuri-chlorobenzoic Acid.

See Mercuri-carboxyphenyl chloride.

Mercuri-chlorobenzophenone.

See Mercuri-benzoylphenyl chloride.

Mercuri-cyclohexyl bromide



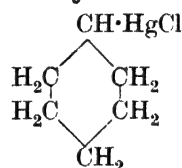
Leaflets from C_6H_6 . M.p. 153° (141°). Sol. Py. Less sol. Et_2O , C_6H_6 . Insol. H_2O . Sensitive to light.

Grüttner, *Ber.*, 1914, **47**, 1653.

Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.

Tiffeneau, Gannagé, *Chem. Zentr.*, 1921, **I**, 766.

Mercuri-cyclohexyl chloride

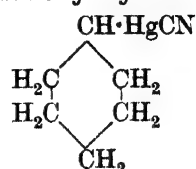


Plates. M.p. 163-4° (159°).

Grüttner, *Ber.*, 1914, **47**, 1654.

See also last reference above.

Mercuri-cyclohexyl cyanide

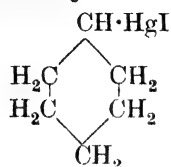


Mercuri-cyclohexyl iodide

Leaflets from EtOH. M.p. 144°. Sensitive to light.

Grüttner, *Ber.*, 1914, **47**, 1656.

Tiffeneau, Gannagé, *Chem. Zentr.*, 1921, I, 766.

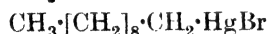
Mercuri-cyclohexyl iodide

$C_6H_{11}IHg$ MW, 410.5

Plates. M.p. 143°. Sensitive to light.

Grüttner, *Ber.*, 1914, **47**, 1654.

See also second reference above.

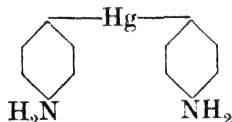
Mercuri-decyl bromide

$C_{10}H_{21}BrHg$ MW, 421.5

Cryst. from EtOH. M.p. 111.0–111.4°.

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.

p-Mercuri-dianiline (*p-Mercuri-bis-aniline, mercury di-p-aminophenyl*)



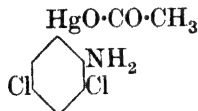
$C_{12}H_{12}N_2Hg$ MW, 384.5

Needles. M.p. 174°.

N : N'-Diacetyl : needles. M.p. 244–6°.

Pesci, *Gazz. chim. ital.*, 1893, **23**, 529.

Mercuri-3 : 5-dichloro - 2 - aminophenyl acetate



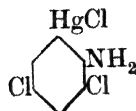
$C_8H_7O_2NCl_2Hg$ MW, 420.5

M.p. 170–1°.

N-Acetyl : m.p. 233°.

Vecchiotti, Carani, *Gazz. chim. ital.*, 1926, **56**, 150.

Mercuri-3 : 5-dichloro - 2 - aminophenyl chloride



$C_6H_4NCl_3Hg$ MW, 397

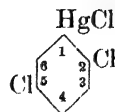
Dict. of Org. Comp.—II.

577 Mercuri-p-diethylaminophenyl acetate

M.p. 193°.

Vecchiotti, Carani, *Gazz. chim. ital.*, 1926, **56**, 151.

Mercuri-2 : 5-dichlorophenyl chloride



$C_6H_3Cl_3Hg$ MW, 382

M.p. 208°. Sol. hot EtOH, Me_2CO , $AcOEt$, hot C_6H_6 . Insol. H_2O , pet. ether.

Nesmejanov, *Ber.*, 1929, **62**, 1017.

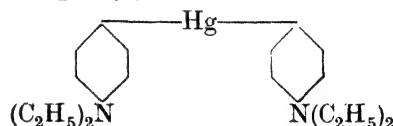
Nesmejanov, Gluschnev, Epifanski, Flegontov, *Ber.*, 1934, **67**, 133.

Mercuri-3 : 5-dichlorophenyl chloride.

M.p. 208°. Sol. hot EtOH, Me_2CO , hot C_6H_6 . Mod. sol. Et_2O , hot $CHCl_3$. Insol. H_2O , pet. ether.

See first reference above.

p-Mercuri-di-diethylaniline (*Mercury di-diethylaminophenyl*)

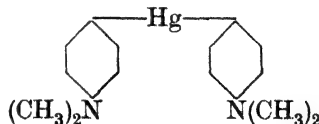


$C_{20}H_{28}N_2Hg$ MW, 496.5

Prisms from C_6H_6 . M.p. 160.6°. Sol. Et_2O . Insol. EtOH.

Pesci, *Zeitschrift für anorganische Chemie*, 1897, **15**, 220.

p-Mercuri-di-dimethylaniline (*Mercury di-p-dimethylaminophenyl*)

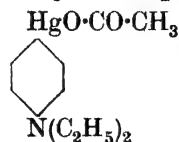


$C_{16}H_{20}N_2Hg$ MW, 440.5

Needles + C_6H_6 from C_6H_6 . Loses C_6H_6 on standing. M.p. 169°. Sol. $CHCl_3$, dil. min. acids. Spar. sol. EtOH, Et_2O .

Hein, Wagler, *Ber.*, 1925, **58**, 1507.

Mercuri-p-diethylaminophenyl acetate

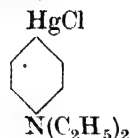


$C_{12}H_{17}O_2NHg$ MW, 407.5

Mercuri-*p*-diethylaminophenyl chloride 578

Needles. M.p. 104.4°. Sol. EtOH, Et₂O, dil. AcOH.

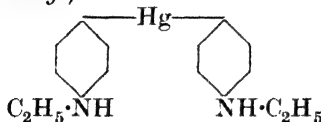
Piccinini, *Gazz. chim. ital.*, 1893, **23**, 534.

Mercuri-*p*-diethylaminophenyl chloride

C₁₀H₁₄NClHg MW, 384

Needles. M.p. 164.5°. Spar. sol. hot H₂O.

See previous reference.

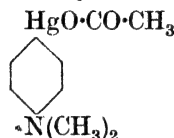
***p*-Mercuri-di-ethylaniline (Mercury di-*p*-ethylaminophenyl)**

C₁₆H₂₀N₂Hg MW, 440.5

Needles from xylene, or plates from EtOH or C₆H₆. M.p. 166°.

Ruspaggiari, *Gazz. chim. ital.*, 1893, **23**, 544.

Pesci, *Zeitschrift für anorganische Chemie*, 1897, **15**, 219.

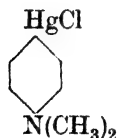
Mercuri-*p*-dimethylaminophenyl acetate

C₁₀H₁₃O₂NHg MW, 379.5

Needles. M.p. 165°. Sol. CHCl₃, dil. AcOH, C₆H₆. Insol. H₂O.

Pesci, *Gazz. chim. ital.*, 1893, **23**, 521.

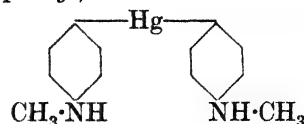
Dimroth, *Ber.*, 1902, **35**, 2045.

Mercuri-*p*-dimethylaminophenyl chloride

C₈H₁₀NClHg MW, 356

Plates from EtOH. M.p. 225° decomp. Sol. HCl, CHCl₃. Less sol. C₆H₆.

See second reference above and also Michaelis, Rabinerson, *Ber.*, 1890, **23**, 2342.

Mercuri-ethyl bromide***p*-Mercuri-di-methylaniline (Mercury di-*p*-methylaminophenyl)**

C₁₄H₁₆N₂Hg MW, 412.5

Needles from C₆H₆. M.p. 178-9°. Spar. sol. EtOH. Insol. Et₂O.

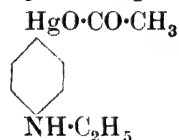
Pesci, *Gazz. chim. ital.*, 1893, **23**, 529.

Mercuri-ethyl acetate

C₄H₈O₂Hg MW, 288.5

M.p. 54°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.

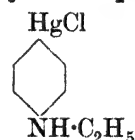
Mercuri-*p*-ethylaminophenyl acetate

C₁₀H₁₃O₂NHg MW, 379.5

Prisms. M.p. 130°. Sol. EtOH. Insol. H₂O.

Ruspaggiari, *Gazz. chim. ital.*, 1893, **23**, 544.

Pesci, *Zeitschrift für anorganische Chemie*, 1897, **15**, 219.

Mercuri-*p*-ethylaminophenyl chloride

C₈H₁₀NClHg MW, 356

Plates. M.p. 142°. Sol. hot EtOH. Insol. H₂O.

See previous references.

Mercuri-ethyl bromide

C₂H₅BrHg MW, 309.5

Cryst. from EtOH. M.p. 198° (193.5°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 273.

Mercuri-ethyl chloride

$\text{C}_2\text{H}_5\text{ClHg}$ MW, 265

Cryst. from EtOH. M.p. 192.5°. Insol. H_2O .
Spar. sol. Et_2O .

Crymble, *J. Chem. Soc.*, 1914, **105**, 668.

Willgerodt, *Ber.*, 1898, **31**, 921.

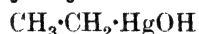
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 274.

Mercuri-ethyl cyanide

$\text{C}_3\text{H}_5\text{NHg}$ MW, 255.5

Needles from dil. MeOH. M.p. 77°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 294.

Mercuri-ethyl hydroxide

$\text{C}_2\text{H}_6\text{OHg}$ MW, 246.5

M.p. 37°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 283.

Mercuri-ethyl iodide

$\text{C}_2\text{H}_5\text{IHg}$ MW, 356.5

Cryst. from EtOH. M.p. 186° (182°).

Crymble, *J. Chem. Soc.*, 1914, **105**, 668.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 274.

Mercuri-*p*-ethylphenyl bromide

$\text{C}_8\text{H}_9\text{BrHg}$ MW, 385.5

M.p. 227–8°.

Whitmore, Sobatzki, *J. Am. Chem. Soc.*, 1933, **55**, 1130.

Mercuri-*p*-ethylphenyl chloride

$\text{C}_8\text{H}_9\text{ClHg}$ MW, 341

M.p. 221°.

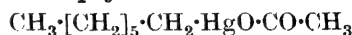
See previous reference.

Mercuri-*p*-ethylphenyl iodide

$\text{C}_8\text{H}_9\text{IHg}$ MW, 432.5

M.p. 229°.

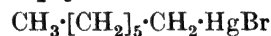
See previous reference.

Mercuri-heptyl acetate

$\text{C}_9\text{H}_{18}\text{O}_2\text{Hg}$ MW, 358.5

Plates. M.p. 54°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.

Mercuri-heptyl bromide

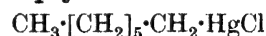
$\text{C}_7\text{H}_{15}\text{BrHg}$ MW, 379.5

Cryst. from EtOH. M.p. 118.5° (114.5°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.

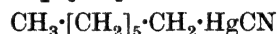
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 279.

Mercuri-heptyl chloride

$\text{C}_7\text{H}_{15}\text{ClHg}$ MW, 335

Plates from EtOH. M.p. 119.5°.

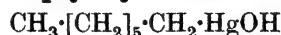
See last reference above.

Mercuri-heptyl cyanide

$\text{C}_8\text{H}_{15}\text{NHg}$ MW, 325.5

Yellow needles from dil. MeOH. M.p. 53°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 295.

Mercuri-heptyl hydroxide

$\text{C}_7\text{H}_{16}\text{OHg}$ MW, 316.5

Plates. M.p. 54°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 286.

Mercuri-heptyl iodide

$\text{C}_7\text{H}_{15}\text{IHg}$ MW, 426.5

Plates from EtOH. M.p. 103°.

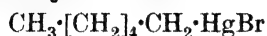
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 280.

Mercuri-hexyl acetate

$\text{C}_8\text{H}_{16}\text{O}_2\text{Hg}$ MW, 344.5

Plates. M.p. 50°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.

Mercuri-hexyl bromide

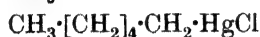
$\text{C}_6\text{H}_{13}\text{BrHg}$ MW, 365.5

Cryst. from EtOH. M.p. 127.5° (122.0–122.2°, 118.5°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.

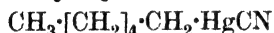
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 278.

Mercuri-hexyl chloride

$\text{C}_6\text{H}_{13}\text{ClHg}$ MW, 321

Plates from EtOH. M.p. 125°.

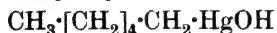
See last reference above.

Mercuri-hexyl cyanide

$\text{C}_7\text{H}_{13}\text{NHg}$ MW, 311.5

Cryst. from dil. MeOH. M.p. 38°.

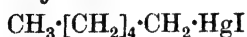
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 295.

Mercuri-hexyl hydroxide

$\text{C}_6\text{H}_{14}\text{OHg}$ MW, 302.5

Plates. M.p. 54.5°.

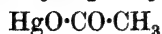
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 286.

Mercuri-hexyl iodide

$\text{C}_6\text{H}_{13}\text{IHg}$ MW, 412.5

Plates from EtOH. M.p. 110°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 279.

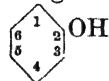
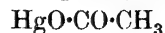
1-Mercuri-2-hydroxynaphthyl acetate

$\text{C}_{12}\text{H}_{10}\text{O}_3\text{Hg}$

MW, 402.5

Needles. M.p. 185° decomp. Spar. sol; most org. solvents.

Bamberger, *Ber.*, 1898, **31**, 2624.

Mercuri-*o*-hydroxyphenyl acetate

$\text{C}_8\text{H}_8\text{O}_3\text{Hg}$ MW, 352.5

Needles or prisms. M.p. 157°. Decomp. at 210–15°.

Me ether: $\text{C}_9\text{H}_{10}\text{O}_3\text{Hg}$. MW, 366.5. M.p. 124°.

Mameli, *Gazz. chim. ital.*, 1922, **52**, 352.

König, Scharnbeck, *J. prakt. Chem.*, 1930, **128**, 169.

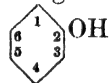
Mercuri-*p*-hydroxyphenyl acetate.

Needles or prisms. M.p. 165°. Decomp. at 210–15°.

Me ether: needles from dil. EtOH. M.p. 176.5°.

Et ether: $\text{C}_{10}\text{H}_{12}\text{O}_3\text{Hg}$. MW, 380.5. M.p. 162°.

See previous references.

Mercuri-*o*-hydroxyphenyl bromide

$\text{C}_6\text{H}_5\text{OBrHg}$ MW, 373.5

Needles. M.p. 130–2° (122°). Decomp. at 195°.

Mameli, *Gazz. chim. ital.*, 1922, **52**, 352.

Caius, Wadia, *J. Ind. Chem. Soc.*, 1929, **6**, 616.

Mercuri-*p*-hydroxyphenyl bromide.

Cryst. M.p. 144–6°. Decomp. at 200–210°.

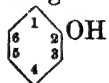
Me ether: $\text{C}_7\text{H}_7\text{OBrHg}$. MW, 387.5. M.p. 187°.

Et ether: $\text{C}_8\text{H}_9\text{OBrHg}$. MW, 401.5. M.p. 241.5°.

See first reference above and also

Michaelis, Geisler, *Ber.*, 1894, **27**, 259.

Michaelis, Robinson, *Ber.*, 1890, **23**, 2345.

Mercuri-*o*-hydroxyphenyl chloride

$\text{C}_6\text{H}_5\text{OClHg}$ MW, 329

Cryst. from hot H_2O or EtOH. Aq. M.p. 152.5° (146.5°).

Acetyl: m.p. 170–1°.

Me ether: C_7H_7OClHg . MW, 343. Cryst. from C_6H_6 . M.p. 180–1° (173–4°).

Dimroth, *Ber.*, 1902, **35**, 2853.

Whitmore, Middleton, *J. Am. Chem. Soc.*, 1921, **43**, 622.

Nesmejanov, *Ber.*, 1929, **62**, 1015.

Caius, Wadia, *J. Ind. Chem. Soc.*, 1929, **6**, 616.

Mercuri-*m*-hydroxyphenyl chloride.

Powder from EtOH.Aq. M.p. 240.5–241.5°.

Me ether: m.p. 158°.

Bean, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 4422.

König, Scharnbeck, *J. prakt. Chem.*, 1930, **128**, 170.

Mercuri-*p*-hydroxyphenyl chloride.

Plates from Me_2CO . M.p. 226–7° (224–5°, 216°). $HCl \rightarrow$ phenol + mercuric chloride.

Acetyl: m.p. 235°.

Me ether: plates. M.p. 239°. Sol. $CHCl_3$, hot C_6H_6 . Spar. sol. EtOH.

Et ether: C_8H_9OClHg . MW, 357. M.p. 249–50° (241.5°, 238°, 234°).

Dimroth, *Ber.*, 1902, **35**, 2853.

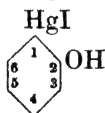
Whitmore, Middleton, *J. Am. Chem. Soc.*, 1921, **43**, 622.

Nesmejanov, *Ber.*, 1929, **62**, 1015.

Caius, Wadia, *J. Ind. Chem. Soc.*, 1929, **6**, 616.

Michaelis, Robinson, *Ber.*, 1890, **23**, 2344.

Mercuri-*o*-hydroxyphenyl iodide



C_6H_5OIHg MW, 420.5

Prisms. M.p. 121° (106.5°). Decomp. at 200–210°.

Me ether: C_7H_7OIHg . MW, 434.5. Needles. M.p. 165°.

Mameli, *Gazz. chim. ital.*, 1922, **52**, 352.

Mercuri-*p*-hydroxyphenyl iodide.

Powder. M.p. 134.5°. Decomp. at 200–210°.

Me ether: plates. M.p. 227°.

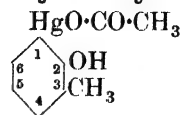
Et ether: C_8H_9OIHg . MW, 448.5. Needles. M.p. 216°.

See above reference and also

Michaelis, Geisler, *Ber.*, 1894, **27**, 259.

Michaelis, Robinson, *Ber.*, 1890, **23**, 2345.

Mercuri-2-hydroxy-*m*-tolyl acetate



$C_9H_{10}O_3Hg$ MW, 366.5

M.p. 123–5°. $Br \rightarrow$ 3-bromo-*o*-cresol.

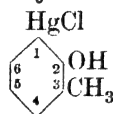
Mameli, *Gazz. chim. ital.*, 1926, **56**, 955.

Mercuri-4-hydroxy-*m*-tolyl acetate.

M.p. 153–5°. $Br \rightarrow$ 5-bromo-*o*-cresol.

Mameli, *Gazz. chim. ital.*, 1926, **56**, 952.

Mercuri-2-hydroxy-*m*-tolyl chloride



C_9H_7OClHg MW, 343

M.p. 160–2°.

Mameli, *Gazz. chim. ital.*, 1926, **56**, 957.

Mercuri-4-hydroxy-*m*-tolyl chloride.

M.p. 200–2° decomp.

See previous reference.

Mercuri-6-hydroxy-*m*-tolyl chloride.

Needles from C_6H_6 . M.p. 166°. Becomes turbid at 176° and resolidifies at 183°. Sol. EtOH.

Benzoyl: m.p. 241–2°.

Dimroth, *Ber.*, 1902, **35**, 2857.

Mercuri-isoamyl bromide



$C_5H_{11}BrHg$ MW, 351.5

M.p. 80°.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3010.

Mercuri-isoamyl chloride



$C_5H_{11}ClHg$ MW, 307

M.p. 86°. Sol. hot EtOH, Et_2O . Insol. H_2O . Sublimes.

See previous reference.

Mercuri-isoamyl iodide



$C_5H_{11}IHg$ MW, 398.5

Plates from EtOH. M.p. 122°. Sol. Et_2O . Spar. sol. hot, insol. cold H_2O .

See previous reference.

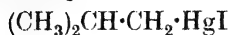
Mercuri-isobutyl bromide



C_4H_9BrHg MW, 337.5

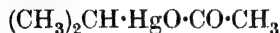
Mercuri-isobutyl iodide

Cryst. from EtOH.Aq. M.p. 55-5°.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.**Mercuri-isobutyl iodide** $\text{C}_4\text{H}_9\text{IHg}$ MW, 384.5

Cryst. from EtOH.Aq. M.p. 72°.

See previous reference.

Mercuri-isopropyl acetate $\text{C}_5\text{H}_{10}\text{O}_2\text{Hg}$ MW, 302.5

M.p. 95°.

Goret, *Chem. Zentr.*, 1922, III, 1371.**Mercuri-isopropyl bromide** $\text{C}_3\text{H}_7\text{BrHg}$ MW, 323.5

Needles. M.p. 98° (93-5°).

Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.

See also above reference.

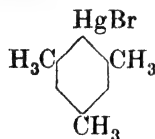
Mercuri-isopropyl chloride $\text{C}_3\text{H}_7\text{ClHg}$ MW, 279

Needles. M.p. 97°.

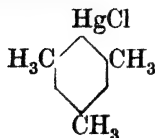
Goret, *Chem. Zentr.*, 1922, III, 1371.**Mercuri-isopropyl iodide** $\text{C}_3\text{H}_7\text{IHg}$ MW, 370.5

M.p. 125°.

See previous reference.

Mercuri-mesityl bromide (*Mercuri-2 : 4 : 6-trimethylphenyl bromide*) $\text{C}_9\text{H}_{11}\text{BrHg}$ MW, 399.5

M.p. 194°.

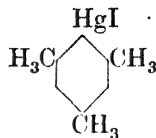
Michaelis, *Ber.*, 1895, **28**, 592.**Mercuri-mesityl chloride** (*Mercuri-2 : 4 : 6-trimethylphenyl chloride*) $\text{C}_9\text{H}_{11}\text{ClHg}$ MW, 355

582

Mercuri-methyl bromide

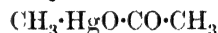
Needles. M.p. 200°.

See previous reference.

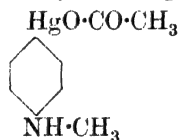
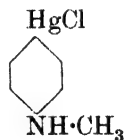
Mercuri-mesityl iodide (*Mercuri-2 : 4 : 6-trimethylphenyl iodide*) $\text{C}_9\text{H}_{11}\text{IHg}$ MW, 446.5

Needles. M.p. 178°.

See previous reference.

Mercuri-methyl acetate $\text{C}_3\text{H}_6\text{O}_2\text{Hg}$ MW, 274.5

Plates. M.p. 101°.

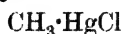
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 295.**Mercuri-p-methylaminophenyl acetate** $\text{C}_9\text{H}_{11}\text{O}_2\text{NHg}$ MW, 365.5Plates. M.p. 149° decomp. Sol. hot EtOH, dil. AcOH. Insol. H_2O , Et_2O .Pesci, *Zeitschrift für anorganische Chemie*, 1897, **15**, 216.**Mercuri-p-methylaminophenyl chloride** $\text{C}_7\text{H}_8\text{NClHg}$ MW, 342

Yellow powder. M.p. 108° decomp.

Pesci, *Zeitschrift für anorganische Chemie*, 1897, **15**, 217.**Mercuri-methyl bromide** CH_3BrHg MW, 295.5

Cryst. from EtOH. M.p. 172° (160.8-161.3°).

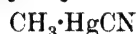
Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.Crymble, *J. Chem. Soc.*, 1914, **105**, 668.Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 272.

Mercuri-methyl chloride

CH_3ClHg MW, 251
Cryst. from EtOH. M.p. 170°. Volatile in steam.

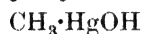
Seidel, *J. prakt. Chem.*, 1884, **29**, 136.
Hilpert, Ditmar, *Ber.*, 1913, **46**, 3740.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 273.

See also second reference above.

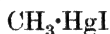
Mercuri-methyl cyanide

$\text{C}_2\text{H}_3\text{NHg}$ MW, 241.5
Acicular plates with faint garlic odour. M.p. 93°. Sol. H_2O , EtOH, C_6H_6 . Mod. sol. Et_2O . Insol. ligroin.

Coates, Hinkel, Angel, *J. Chem. Soc.*, 1928, 542.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 294.

Mercuri-methyl hydroxide

CH_4OHg MW, 232.5
M.p. 137° (106°).
Hinkel, Angel, *J. Chem. Soc.*, 1927, 1950.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 282.

Mercuri-methyl iodide

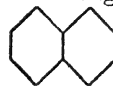
CH_3IHg MW, 342.5
Cryst. from EtOH. M.p. 152° (145°). Sol. Et_2O . Insol. H_2O .
Crymble, *J. Chem. Soc.*, 1914, **105**, 668.
Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 156.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 273.

See also first reference above.

Mercuri-1-naphthyl acetate

$\text{C}_{12}\text{H}_{10}\text{O}_2\text{Hg}$ MW, 386.5
Needles from EtOH. M.p. 154°. Sol. hot EtOH, AcOH, CHCl_3 , CS_2 , C_6H_6 . Spar. sol. Et_2O . Insol. H_2O . $\text{HCl} \rightarrow$ naphthalene, acetic acid, and mercuric chloride. $\text{I} \rightarrow$ 1-iodonaphthalene, mercuric iodide, and acetic acid.

Dimroth, *Ber.*, 1902, **35**, 2035.

Mercuri-1-naphthyl bromide

$\text{C}_{10}\text{H}_7\text{BrHg}$ MW, 407.5
Needles or plates. M.p. 202°. Sol. EtOH, CHCl_3 , CS_2 , C_6H_6 . Insol. H_2O .
Otto, *Ann.*, 1870, **154**, 190.
Hilpert, Grüttner, *Ber.*, 1913, **46**, 1686.

Mercuri-1-naphthyl chloride

$\text{C}_{10}\text{H}_7\text{ClHg}$ MW, 363
Plates from toluene. M.p. 193° (188–9°). Mod. sol. EtOH, C_6H_6 . Insol. H_2O .
Steinkopf, *Ann.*, 1917, **413**, 330.
McClure, Lowy, *J. Am. Chem. Soc.*, 1931, **53**, 319.
Nesmejanov, *Ber.*, 1929, **62**, 1014.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 289.

Mercuri-2-naphthyl chloride

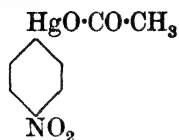
$\text{C}_{10}\text{H}_7\text{ClHg}$ MW, 363
M.p. 270°.
Nesmejanov, *Ber.*, 1929, **62**, 1014.

Mercuri-1-naphthyl hydroxide

$\text{C}_{10}\text{H}_8\text{OHg}$ MW, 344.5
Sinters at 228°.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 289.

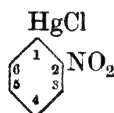
Mercuri-1-naphthyl iodide

$\text{C}_{10}\text{H}_7\text{IHg}$ MW, 454.5
Plates from toluene. M.p. 219° (185.5–186°). Sol. hot EtOH, CHCl_3 , C_6H_6 , CS_2 . Spar. sol. cold EtOH, Et_2O . Insol. H_2O .
See previous reference and also Steinkopf, *Ann.*, 1917, **413**, 330.

Mercuri-*p*-nitrophenyl acetate $\text{C}_8\text{H}_7\text{O}_4\text{NHg}$

MW, 381.5

Cryst. from EtOH. M.p. 202–203.5°.

Seide, Scherlin, Bras, *J. prakt. Chem.*, 1933, 138, 66.**Mercuri-*o*-nitrophenyl chloride** $\text{C}_6\text{H}_4\text{O}_2\text{NClHg}$

MW, 358

Yellow needles from ligroin or plates from AcOH. M.p. 185° (181–2°). Sol. hot EtOH, Et₂O, Me₂CO. Insol. H₂O. Br in KBr.Aq. → *o*-bromonitrobenzene.Dimroth, *Ber.*, 1902, 35, 2036.Kharasch, Chalkley, *J. Am. Chem. Soc.*, 1921, 43, 611.Dimroth, Schweizer, Bamberger, *Ann.*, 1926, 446, 153.Nesmejanov, Gluschnev, Epifanski, Flegontov, *Ber.*, 1934, 67, 133.**Mercuri-*m*-nitrophenyl chloride.**

Cryst. from EtOH. M.p. 236–7°.

Kharasch, Chalkley, *J. Am. Chem. Soc.*, 1921, 43, 612.

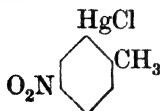
See also last two references above.

Mercuri-*p*-nitrophenyl chloride.

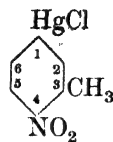
Cryst. from EtOH. M.p. 265–6° decomp.

Seide, Scherlin, Bras, *J. prakt. Chem.*, 1933, 138, 67.Nesmejanov, Gluschnev, Epifanski, Flegontov, *Ber.*, 1934, 67, 133.

See also first reference above.

Mercuri-5-nitro-*o*-tolyl chloride $\text{C}_7\text{H}_6\text{O}_2\text{NClHg}$

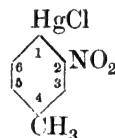
MW, 372

Needles from Me₂CO. M.p. 230–1°.Coffey, *J. Chem. Soc.*, 1926, 3220.**Mercuri-4-nitro-*m*-tolyl chloride** $\text{C}_7\text{H}_6\text{O}_2\text{NClHg}$

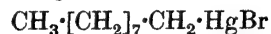
MW, 372

Needles from Me₂CO. M.p. 210°.Coffey, *J. Chem. Soc.*, 1926, 642.**Mercuri-5-nitro-*m*-tolyl chloride.**

Needles from AcOH. M.p. 294°. Br in KBr.Aq. → 5-bromo-3-nitrotoluene.

Coffey, *J. Chem. Soc.*, 1926, 3223.**Mercuri-6-nitro-*m*-tolyl chloride.**Needles from Me₂CO. M.p. 226–7°.Coffey, *J. Chem. Soc.*, 1926, 3222.**Mercuri-2-nitro-*p*-tolyl chloride** $\text{C}_7\text{H}_6\text{O}_2\text{NClHg}$

MW, 372

Pale yellow needles from Me₂CO. M.p. 210°. Sinters at 207°.Coffey, *J. Chem. Soc.*, 1926, 3223.**Mercuri-3-nitro-*p*-tolyl chloride.**Needles from Me₂CO. M.p. 220.5–221°. Sol. Me₂CO, hot AcOH. Spar. sol. other org. solvents. Br in CHCl₃ → 4-bromo-2-nitrotoluene.Coffey, *J. Chem. Soc.*, 1926, 638.**Mercuri-nonyl bromide** $\text{C}_9\text{H}_{19}\text{BrHg}$

MW, 407.5

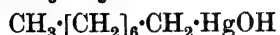
Cryst. from EtOH. M.p. 111.6–112.0° (109°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, 55, 4207.Hill, *J. Am. Chem. Soc.*, 1928, 50, 167.**Mercuri-octyl bromide** $\text{C}_8\text{H}_{17}\text{BrHg}$

MW, 393.5

Cryst. from EtOH. M.p. 114.8–115° (109°).

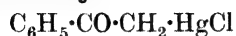
See first reference above and also Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, 47, 3011.

Mercuri-octyl hydroxide

$\text{C}_8\text{H}_{18}\text{OHg}$ MW, 330.5

Yellow plates. M.p. 75°. Sol. EtOH. Spar. sol. H_2O .

Eichler, *Ber.*, 1879, 12, 1882.

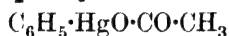
Mercuri-phenacyl chloride

$\text{C}_8\text{H}_7\text{OClHg}$ MW, 355

Needles from ligroin. M.p. 145–6°. $\text{HCl} \longrightarrow$ acetophenone + mercuric chloride. $\text{Br} \longrightarrow$ phenacyl bromide.

Dimroth, *Ber.*, 1902, 35, 2869.

Grignard, Abelman, *Bull. soc. chim.*, 1916, 19, 19.

Mercuri-phenyl acetate

$\text{C}_8\text{H}_8\text{O}_2\text{Hg}$ MW, 336.5

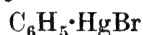
Prisms from C_6H_6 . M.p. 149°. Sol. hot H_2O , EtOH, AcOH, C_6H_6 . $\text{HCl} \longrightarrow \text{C}_6\text{H}_6 + \text{CH}_3 \cdot \text{COOH} + \text{HgCl}_2$. $\text{I} \longrightarrow$ iodobenzene + $\text{CH}_3\text{COOH} + \text{HgI}_2$.

Maynard, *J. Am. Chem. Soc.*, 1924, 46, 1511.

Dimroth, *Ber.*, 1899, 32, 759.

Seide, Scherlin, Bras, *J. prakt. Chem.*, 1933, 138, 66.

I.G., D.R.P., 548,902, (*Chem. Abstracts*, 1932, 26, 4068); 553,280, (*Chem. Abstracts*, 1932, 26, 5965).

Mercuri-phenyl bromide

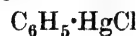
$\text{C}_6\text{H}_5\text{BrHg}$ MW, 357.5

Plates from hot C_6H_6 or Py. M.p. 276° (280°, 291°).

Hilpert, Grüttner, *Ber.*, 1913, 46, 1686.

Dreher, Otto, *Ann.*, 1870, 154, 111.

Hill, *J. Am. Chem. Soc.*, 1928, 50, 167.

Mercuri-phenyl chloride

$\text{C}_6\text{H}_5\text{ClHg}$ MW, 313

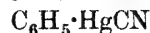
Plates from hot C_6H_6 . M.p. 258° (271°, 250°). Spar. sol. cold EtOH, cold C_6H_6 . Insol. H_2O . Sublimes. NaI in $\text{Me}_2\text{CO} \longrightarrow$ mercuri-phenyl iodide.

Steinkopf, *Ann.*, 1917, 413, 329.

Roeder, Blasi, *Ber.*, 1914, 47, 2751.

McClure, Lowy, *J. Am. Chem. Soc.*, 1931, 53, 319.

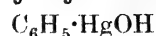
Nesmejanov, *Ber.*, 1929, 62, 1013.

Mercuri-phenyl cyanide

$\text{C}_7\text{H}_5\text{NHg}$ MW, 303.5

Plates from C_6H_6 . M.p. 203–4°. $\text{I} \longrightarrow \text{CNI} +$ mercuri-phenyl iodide.

Otto, *J. prakt. Chem.*, 1870, 1, 182.

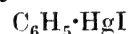
Mercuri-phenyl hydroxide

$\text{C}_6\text{H}_6\text{OHg}$ MW, 294.5

Prisms. Sinters at 195°. M.p. above 200°. Sol. EtOH, C_6H_6 . Spar. sol. cold H_2O . Liberates NH_3 from ammonium salts. Forms salts with acids.

Otto, *J. prakt. Chem.*, 1870, 1, 183.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, 120, 287.

Mercuri-phenyl iodide

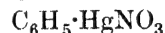
$\text{C}_6\text{H}_5\text{IHg}$ MW, 404.5

Plates from hot C_6H_6 . M.p. 266° (269°). Sol. CHCl_3 , hot C_6H_6 . Prac. insol. cold EtOH, Et_2O , cold C_6H_6 . Insol. H_2O .

Steinkopf, *Ann.*, 1917, 413, 329.

Dreher, Otto, *Ann.*, 1870, 154, 109.

Nesmejanov, *Ber.*, 1929, 62, 1013.

Mercuri-phenyl nitrate

$\text{C}_6\text{H}_5\text{O}_3\text{NHg}$ MW, 339.5

Plates from EtOH. M.p. 188° decomp. Sol. hot EtOH, C_6H_6 . Spar. sol. hot H_2O .

Woollett, Coulter, *J. Am. Chem. Soc.*, 1934, 56, 1922.

Challenger, Rothstein, *J. Chem. Soc.*, 1934, 1260.

Bamberger, *Ber.*, 1897, 30, 512.

Mercuri-phenyl thiocyanate

$\text{C}_7\text{H}_5\text{NSHg}$ MW, 335.5

Plates from EtOH or C_6H_6 . M.p. 231–232.5°. Insol. H_2O .

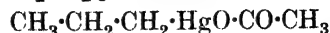
Steinkopf, *Ann.*, 1921, 424, 60.

Otto, *J. prakt. Chem.*, 1870, 1, 182.

Söderbäck, *Ann.*, 1919, 419, 266.

Mercuri-picryl chloride.

See Mercuri-2 : 4 : 6-trinitrophenyl chloride.

Mercuri-propyl acetate

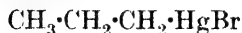
$\text{C}_5\text{H}_{10}\text{O}_2\text{Hg}$ MW, 302.5

M.p. 57–8°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.

Goret, *Chem. Zentr.*, 1922, III, 1371.

Mercuri-propyl bromide



$\text{C}_3\text{H}_7\text{BrHg}$ MW, 323.5

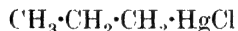
Cryst. from EtOH. M.p. 140° (138°, 135.4°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 274.

Mercuri-propyl chloride



$\text{C}_3\text{H}_7\text{ClHg}$ MW, 279

Cryst. from EtOH.Aq. M.p. 147° (140°, 143°).

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3010.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 275.

Goret, *Chem. Zentr.*, 1922, III, 1371.

Mercuri-propyl cyanide

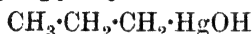


$\text{C}_4\text{H}_7\text{NHg}$ MW, 269.5

Needles from dil. MeOH. M.p. 28°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 294.

Mercuri-propyl hydroxide

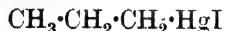


$\text{C}_3\text{H}_8\text{OHg}$ MW, 260.5

Cryst. from Py. M.p. 78°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 284.

Mercuri-propyl iodide



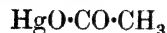
$\text{C}_3\text{H}_7\text{IHg}$ MW, 370.5

Cryst. from EtOH.Aq. M.p. 113°.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 275.

Mercuri-o-tolyl acetate



$\text{C}_9\text{H}_{10}\text{O}_2\text{Hg}$

MW, 350.5

M.p. 101°.

König, Scharrnbeck, *J. prakt. Chem.*, 1930, **128**, 170.

Mercuri-m-tolyl acetate.

Needles from H_2O . M.p. 83–4°. Sol. hot H_2O , EtOH.

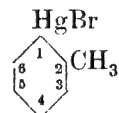
Michaelis, *Ber.*, 1895, **28**, 590.

Mercuri-p-tolyl acetate.

Prisms from EtOH or C_6H_6 . M.p. 153°.

Dreher, Otto, *Ann.*, 1870, **154**, 174.

Mercuri-o-tolyl bromide



$\text{C}_7\text{H}_7\text{BrHg}$ MW, 371.5

Needles from EtOH or xylene. M.p. 169.5°. Sol. hot C_6H_6 , aniline, Py. Pptd. on addition of pet. ether. Spar. sol. cold EtOH, Et_2O , C_6H_6 , CHCl_3 , Me_2CO . KI in EtOH \rightarrow mercuri-o-tolyl iodide.

Hilpert, Grüttner, *Ber.*, 1915, **48**, 914.

Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.

Whitmore, Sobatzki, *J. Am. Chem. Soc.*, 1933, **55**, 1128.

Mercuri-m-tolyl bromide.

Needles from EtOH. M.p. 184°.

See second reference above and also Michaelis, *Ber.*, 1895, **28**, 590.

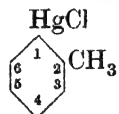
Mercuri-p-tolyl bromide.

Needles from C_6H_6 . M.p. 234–5° (231°). Spar. sol. most org. solvents.

Hilpert, Grüttner, *Ber.*, 1915, **48**, 914.

Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.

Mercuri-o-tolyl chloride



$\text{C}_7\text{H}_7\text{ClHg}$ MW, 327

Cryst. from EtOH. M.p. 146° (143°).

Dimroth, *Ber.*, 1899, **32**, 761.

McClure, Lowy, *J. Am. Chem. Soc.*, 1931, **53**, 319.

Nesmejanov, *Ber.*, 1929, **62**, 1014.

Mercuri-m-tolyl chloride.

Needles. M.p. 159–60°. Sol. CHCl_3 , C_6H_6 . Spar. sol. EtOH. Sublimes.

Michaelis, *Ber.*, 1895, **28**, 589.

Michaelis, Genzken, *Ann.*, 1887, **242**, 185.

Mercuri-*p*-tolyl chloride.

Plates from hot C_6H_6 . M.p. $238-9^\circ$ ($232-3^\circ$).
Sol. hot C_6H_6 . Spar. sol. hot EtOH. Insol.
 H_2O . NaI in $Me_2CO \rightarrow$ mercuri-*p*-tolyl iodide.

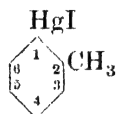
Whitmore, Hamilton, Thurman, *J. Am. Chem. Soc.*, 1923, **45**, 1066.

Peters, *Ber.*, 1905, **38**, 2569.

Dimroth, *Ber.*, 1899, **32**, 761.

McClure, Lowy, *J. Am. Chem. Soc.*, 1931, **53**, 319.

Nesmejanov, *Ber.*, 1929, **62**, 1014.

Mercuri-*o*-tolyl iodide

C_7H_7IHg

MW, 418.5

Prisms from EtOH. M.p. $176-177.5^\circ$.

Hilpert, Grüttner, *Ber.*, 1915, **48**, 914.

Whitmore, Sobatzki, *J. Am. Chem. Soc.*, 1933, **55**, 1128.

Mercuri-*m*-tolyl iodide.

Plates. M.p. $161-2^\circ$.

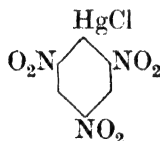
Michaelis, *Ber.*, 1895, **28**, 590.

Mercuri-*p*-tolyl iodide.

Cryst. from toluene. M.p. 217° ($213-14^\circ$).
Spar. sol. most org. solvents.

Steinkopf, *Ann.*, 1917, **413**, 329.

Hilpert, Grüttner, *Ber.*, 1915, **48**, 915.

Mercuri-2 : 4 : 6-trinitrophenyl chloride
(Mercuri-picryl chloride)

$C_6H_2O_6N_3ClHg$

MW, 448

Cryst. from EtOH. M.p. 202° . I in KI.Aq.
 \rightarrow 2 : 4 : 6-trinitroiodobenzene (picryl iodide).

Kharasch, *J. Am. Chem. Soc.*, 1921, **43**, 2243.

Mercury di-*p*-aminophenyl.

See *p*-Mercuri-dianiline.

Mercury dibenzyl

$C_{14}H_{14}Hg$

MW, 382.5

Needles from EtOH. M.p. 111° . Sol. $CHCl_3$,

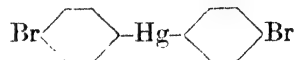
CCl_4 . Less sol. EtOH, AcOEt, C_6H_6 . Insol.
 Et_2O , pet. ether.

Jones, Werner, *J. Am. Chem. Soc.*, 1918, **40**, 1266.

Bañús, *Anales soc. españ. fís. quim.*, 1922, **20**, 667.

Wolff, *Ber.*, 1913, **46**, 64.

Hein, Wagler, *Ber.*, 1925, **58**, 1507.

Mercury di-*p*-bromophenyl

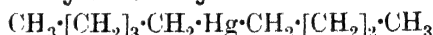
$C_{12}H_8Br_2Hg$

MW, 512.5

Cryst. from Me_2CO . M.p. $243-4^\circ$.

Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1020.

Hein, Wagler, *Ber.*, 1925, **58**, 1509.

Mercury di-*n*-butyl

$C_8H_{18}Hg$

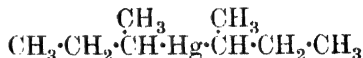
MW, 314.5

B.p. $120-3^\circ/23$ mm., $105^\circ/10$ mm. D_4^{20} 1.7779.
 n_D^{20} 1.5057.

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 153.

Gilman, Brown, *J. Am. Chem. Soc.*, 1930, **52**, 3314.

Jones, Evans, Gulwell, Griffiths, *J. Chem. Soc.*, 1935, 45.

Mercury di-*sec*.-butyl

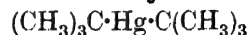
$C_8H_{18}Hg$

MW, 314.5

B.p. $91-3^\circ/15$ mm., $46^\circ/0.3$ mm. D_{20}^{20} 1.763.
 n_D^{20} 1.511. I \rightarrow mercuri-*sec*.-butyl iodide +
sec.-butyl iodide.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 821.

Tafel, *Ber.*, 1906, **39**, 3628.

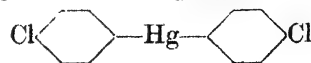
Mercury di-*tert*.-butyl

$C_8H_{18}Hg$

MW, 314.5

B.p. $78-82^\circ/5$ mm. D_{20}^{20} 1.749. n_D^{20} 1.521.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 822.

Mercury di-*p*-chlorophenyl

$C_{12}H_8Cl_2Hg$

MW, 423.5

Needles from Me_2CO . M.p. $242-3^\circ$.

Hein, Wagler, *Ber.*, 1925, **58**, 1509.

Mercury di-*p*-diethylaminophenyl.

See *p*-Mercuri-di-diethylaniline.

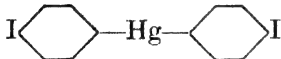
Mercury di-*p*-dimethylaminophenyl.See *p*-Mercuri-di-dimethylaniline.**Mercury diethyl**C₄H₁₀Hg MW, 258.5

B.p. 159°, 57°/16 mm. D₂₀ 2.4660, D₂₅ 2.42346. n_D^{25} 1.53990. Sol. Et₂O. Less sol. EtOH. Insol. H₂O. Heat of comb. C_v 733.6 Cal. Br → mercuri-ethyl bromide + ethyl bromide. I → mercuri-ethyl iodide + ethyl iodide. HCl → mercuri-ethyl chloride + ethane. CH₃·COOH at 120° → mercuri-ethyl acetate. HgCl₂ → mercuri-ethyl chloride. KMnO₄ → mercuri-ethyl hydroxide. Mg → magnesium diethyl + mercury. Zn → zinc diethyl + mercury.

Gilman, Brown, *J. Am. Chem. Soc.*, 1930, **52**, 3314.

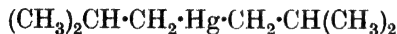
Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 153.

Hein, Wagler, *Ber.*, 1925, **58**, 1506.

Mercury di-*p*-ethylaminophenyl.See *p*-Mercuri-di-ethylaniline.**Mercury di-*p*-iodophenyl**C₁₂H₈I₂Hg MW, 606.5

M.p. 270–2°. Sol. hot Py. Spar. sol. Me₂CO, CHCl₃. Prac. insol. MeOH, EtOH. Insol. H₂O.

Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1020.

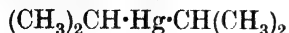
Mercury di-isobutylC₈H₁₈Hg MW, 314.5

B.p. 205–7°. D⁰ 1.747, D₁₅ 1.835, D₄²⁰ 1.6397. n_D^{20} 1.4989. Volatile in steam. I → mercuri-isobutyl iodide + isobutyl iodide.

Marquardt, *Ber.*, 1888, **21**, 2037.

Ponzio, *Gazz. chim. ital.*, 1900, **30**, 24.

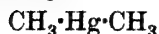
Lewis, Chamberlin, *J. Am. Chem. Soc.*, 1929, **51**, 291.

Mercury di-isopropylC₆H₁₄Hg MW, 286.5

B.p. 119–21°/125 mm. n_D 1.532.

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 153.

Goret, *Chem. Zentr.*, 1922, III, 1371.

Mercury dimethylC₂H₆Hg MW, 230.5

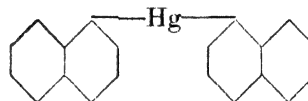
Liq. with faint sweet odour. B.p. 92°/761 mm. Sol. EtOH, Et₂O. Insol. H₂O. D₂₂²² 2.95412. n_D^{25} 1.53266. Heat of comb. C_v 430.8 Cal. Inflammable. Poisonous. I → methyl iodide + mercuri-methyl iodide. HCl → mercuri-methyl chloride + methane. CH₃COOH at 130° → mercuri-methyl acetate + methane. HgI₂ → mercuri-methyl iodide. Zn at 120° → mercury + zinc dimethyl.

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 153.

Maynard, Howard, *J. Chem. Soc.*, 1923, **123**, 960.

Gilman, Brown, *J. Am. Chem. Soc.*, 1930, **52**, 3314.

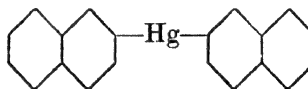
Fuchs, *J. prakt. Chem.*, 1928, **119**, 209.

Mercury di-*p*-methylaminophenyl.See *p*-Mercuri-di-methylaniline.**Mercury di-1-naphthyl (Mercury di- α -naphthyl)**C₂₀H₁₄Hg MW, 454.5

Cryst. M.p. 249° (243°). Sol. hot CS₂, CHCl₃. Spar. sol. C₆H₆. Insol. H₂O. H₂SO₄ → HgSO₄ + naphthalene-1-sulphonic acid. CH₃·COOH → mercuri-1-naphthyl acetate + naphthalene. HgCl₂ → mercuri-1-naphthyl chloride.

Hein, Wagler, *Ber.*, 1925, **58**, 1507.

Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1019.

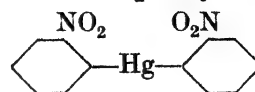
Mercury di-2-naphthyl (Mercury di- β -naphthyl)C₂₀H₁₄Hg MW, 454.5

Cryst. from C₆H₆. M.p. 247–8° (238°). Spar. sol. EtOH, Et₂O. Insol. H₂O. Dist. with soda lime → 2 : 2'-dinaphthyl.

Michaelis, *Ber.*, 1894, **27**, 251.

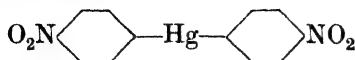
Chattaway, *J. Chem. Soc.*, 1894, **65**, 877.

Beattie, Whitmore, *J. Am. Chem. Soc.*, 1933, **55**, 1571.

Mercury di-*o*-nitrophenylC₁₂H₈O₄N₂Hg MW, 444.5

Needles from hot Me₂CO. M.p. 206–7°.

Hein, Wagler, *Ber.*, 1925, **58**, 1508.

Mercury di-*p*-nitrophenyl $C_{12}H_8O_4N_2Hg$

MW, 444.5

Decomp. at 320°. Prac. insol. usual org. solvents.

Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1020.

Mercury diphenyl $C_{12}H_{10}Hg$

MW, 354.5

Needles. M.p. 124.5°. B.p. 204°/10.5 mm. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Insol. H₂O. Turns yellow on exposure to light. HCl \rightarrow C₆H₆ + HgCl₂. CH₃·COOH \rightarrow C₆H₆ + mercuri-phenyl acetate. HgCl₂ \rightarrow mercuri-phenyl chloride. (CH₃COO)₂Hg \rightarrow mercuri-phenyl acetate. Cu \rightarrow mercury + diphenyl. Mg \rightarrow magnesium diphenyl. Zn \rightarrow zinc diphenyl. CH₃·COCl \rightarrow mercuri-phenyl chloride + acetophenone.

Maynard, *J. Am. Chem. Soc.*, 1924, **46**, 1510.

Calvery, *Organic Syntheses*, 1929, IX, 54.

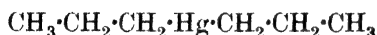
Pfeiffer, Truskier, *Ber.*, 1904, **37**, 1127.

Dreher, Otto, *Ann.*, 1870, **154**, 93.

Steinkopf, Bielenberg, Angestad-Jensen, *Ann.*, 1923, **430**, 71.

Borgstrom, Dewar, *J. Am. Chem. Soc.*, 1929, **51**, 3387.

Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1019.

Mercury dipropyl $C_6H_{14}Hg$

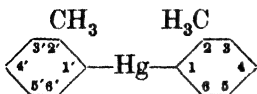
MW, 286.5

B.p. 189–91°, 75–7°/25 mm. Sol. Et₂O. Less sol. EtOH. Insol. H₂O. D²⁰ 2.046, D¹⁶ 2.124. I \rightarrow mercuri-propyl iodide + propyl iodide. Br \rightarrow mercuri-propyl bromide. HCl \rightarrow mercuri-propyl chloride + propane. Zn at 120° \rightarrow zinc dipropyl.

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 153.

Goddard, *J. Chem. Soc.*, 1923, **123**, 1168.

Goret, *Chem. Zentr.*, 1922, III, 1371.

Mercury di-*o*-tolyl (Mercury 2 : 2'-dimethyldiphenyl) $C_{14}H_{14}Hg$

MW, 382.5

Cryst. from C₆H₆. M.p. 108°. B.p. 219°/14 mm.

Michaelis, *Ann.*, 1896, **293**, 292.

Mercury di-*m*-tolyl (Mercury 3 : 3'-dimethyldiphenyl).

Needles from AcOEt. M.p. 102°. Sol. Me₂CO, CHCl₃, C₆H₆. Less sol. EtOH, Et₂O.

Michaelis, *Ber.*, 1895, **28**, 588.

Mercury di-*p*-tolyl (Mercury 4 : 4'-dimethyldiphenyl).

Needles from xylene. M.p. 243–4° (238°). Sol. C₆H₆, CHCl₃. Less sol. EtOH. Insol. H₂O. HCl \rightarrow toluene + HgCl₂. HgCl₂ \rightarrow mercuri-*p*-tolyl chloride.

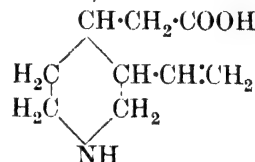
Whitmore, Hamilton, Thurman, *J. Am. Chem. Soc.*, 1923, **45**, 1068.

Ladenburg, *Ann.*, 1874, **173**, 162.

Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1019.

Mercury fulminate.

See under Fulminic Acid.

Meroquinene (Meroquinenine, 4-[3-vinylpiperidyl]-acetic acid) $C_9H_{15}O_2N$

MW, 169

Needles from MeOH. M.p. 223–4° decomp.

N-Acetyl : cryst. M.p. 110°.

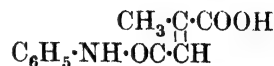
N-Nitroso : cryst. M.p. 67°.

Et ester : C₁₁H₁₉O₂N. MW, 197. Hydrochloride : cryst. from EtOH. M.p. 165°.

B,HAuCl₄ : cryst. M.p. 142° decomp.

Koenigs, *Ber.*, 1894, **27**, 904, 1500; 1897, **30**, 1327.

Kaufmann, *Ber.*, 1913, **46**, 1829.

Mesacon- α -anilic Acid (Mesaconic acid α -anilide) $C_{11}H_{11}O_3N$

MW, 205

Needles from EtOH. M.p. 202°. Sol. MeOH, EtOH. Spar. sol. Et₂O, CHCl₃, C₆H₆. Insol. hot H₂O. Hyd. by KOH at 100°.

Me ester : C₁₂H₁₃O₃N. MW, 219. Needles from MeOH. M.p. 92°. Sol. EtOH, AcOH, C₆H₆, Et₂O.

Et ester : C₁₃H₁₅O₃N. MW, 233. Needles from pet. ether, pet. ether-CHCl₃ or 90% AcOH. M.p. 92°. Sol. EtOH, Et₂O, Me₂CO. Spar. sol. C₆H₆, AcOH, hot pet. ether.

Phenyl ester: $C_{17}H_{15}O_3N$. MW, 281. Cryst. from CCl_4 . M.p. 114–15°. Sol. EtOH, Et_2O .

Chloride: $C_{11}H_{10}O_2NCl$. MW, 223.5. Cryst. from C_6H_6 . M.p. 107°. Sol. Et_2O , C_6H_6 , $CHCl_3$. Insol. pet. ether.

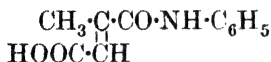
Amide: $C_{11}H_{12}O_2N_2$. MW, 204. Needles from H_2O . M.p. 165°. Sol. EtOH, AcOH, hot H_2O . Spar. sol. Et_2O , cold H_2O .

Anschütz, Haas, Sieplein, *Ann.*, 1907, 353, 181.

Anschütz, Scharfenberg, *ibid.*, 190.

Clarke, *Ann.*, 1908, 359, 192.

Mesacon- β -anilic Acid (*Mesaconic acid* β -anilide)



$C_{11}H_{11}O_3N$ MW, 205

Plates from hot H_2O . M.p. 163°. Sol. hot H_2O . Hyd. by KOH at 100°.

Me ester: $C_{12}H_{13}O_3N$. MW, 219. M.p. 91–2°.

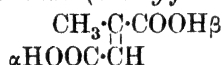
Et ester: $C_{13}H_{15}O_3N$. MW, 233. Needles from 70% AcOH. M.p. 72°. Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. C_6H_6 , AcOH, hot pet. ether.

Phenyl ester: $C_{17}H_{15}O_3N$. MW, 281. Cryst. from Et_2O or CCl_4 . M.p. 121°. Sol. EtOH, $CHCl_3$, C_6H_6 , CS_2 , Me_2CO .

Anschütz, Haas, Sieplein, *Ann.*, 1907, 353, 179.

Clarke, *Ann.*, 1908, 359, 191.

Mesaconic Acid (*Methylfumaryl acid*)



$C_5H_6O_4$ MW, 130

Cryst. from H_2O . M.p. 240.5°. Sublimes in rods. Sol. EtOH, Et_2O . Spar. sol. $CHCl_3$, CS_2 , ligroin. Sol. 38 parts H_2O at 14°, 1 part at 100°. $k = 8.5 \times 10^{-4}$ at 25°.

α -*Me ester*: $C_6H_8O_4$. MW, 144. Cryst. from pet. ether. M.p. 52°. Sol. to 12.07% in H_2O at 20°. $k = 3.53 \times 10^{-4}$ at 23°. β -*Chloride*: $C_6H_7O_3Cl$. MW, 162.5. B.p. 80°/13 mm. β -*Amide*: $C_6H_9O_3N$. MW, 143. Needles from Et_2O . M.p. 103°. β -*Anilide*: see under Mesacon- β -anilic Acid. β -*p-Toluidide*: $C_{13}H_{15}O_3N$. MW, 233. M.p. 105°.

β -*Me ester*: needles from pet. ether. M.p. 84°. B.p. 135–7°/13 mm. Very sol. MeOH, Et_2O , $CHCl_3$, CCl_4 . Sol. C_6H_6 . Sol. to 2.55% in H_2O at 20°. $k = 5.1 \times 10^{-4}$. α -*Chloride*: b.p. 92–3°/20 mm., 78–9°/13 mm. D_{20}^{20} 1.232. α -*Amide*: plates from Et_2O . M.p. 117°. Very sol. Me_2CO . Sol. $CHCl_3$, C_6H_6 . α -*Anilide*: see under Mesacon- α -anilic Acid. α -*p-Toluidide*: needles from MeOH. M.p. 135°.

Di-Me ester: $C_7H_{10}O_4$. MW, 158. B.p. 205.5–206.5°, 100°/16 mm. D_4^{15} 1.148. n_D^{15} 1.4564. Sol. 122 parts H_2O at 15°.

α -*Et ester*: $C_7H_{10}O_4$. MW, 158. Needles from C_6H_6 . M.p. 67°. B.p. 141.6°/14 mm. Very sol. EtOH, Et_2O , $CHCl_3$. Sol. C_6H_6 . Spar. sol. ligroin. Sol. to 1.91% in H_2O at 20°. $k = 3.42 \times 10^{-4}$ at 25°. β -*Chloride*: $C_7H_9O_3Cl$. MW, 176.5. B.p. 86–7°/13 mm. D_{20}^{20} 1.173. β -*Amide*: $C_7H_{11}O_3N$. MW, 157. Prisms. M.p. 78°. β -*Anilide*: see under Mesacon- β -anilic Acid. β -*p-Toluidide*: $C_{14}H_{17}O_3N$. MW, 247. Needles from 50% AcOH. M.p. 99°.

β -*Et ester*: needles from pet. ether. M.p. 68°. Very sol. EtOH, Et_2O , $CHCl_3$. Sol. C_6H_6 . Sol. to 1.49% in H_2O at 20°. $k = 5.53 \times 10^{-4}$ at 25°. α -*Chloride*: b.p. 92–3°/16 mm. D_{20}^{20} 1.184. α -*Amide*: cryst. from Et_2O . M.p. 96°. Very sol. EtOH. Sol. $CHCl_3$, C_6H_6 . α -*Anilide*: see under Mesacon- α -anilic Acid. α -*p-Toluidide*: needles from 70% AcOH. M.p. 103°.

α -*Me- β -Et ester*: $C_8H_{12}O_4$. MW, 172. B.p. 97–8°/13 mm. D_{20}^{20} 1.079.

β -*Me- α -Et ester*: b.p. 95.2–95.6°/12 mm. D_{20}^{20} 1.079.

Di-Et ester: $C_9H_{14}O_4$. MW, 186. B.p. 229°, 93–5°/10 mm. D_4^{15} 1.0598. n_D^{15} 1.4499.

α -*Phenyl ester*: $C_{11}H_{10}O_4$. MW, 206. Needles from pet. ether. M.p. 99°. β -*Amide*: $C_{11}H_{11}O_3N$. MW, 205. Needles from Et_2O . M.p. 114–15°. β -*Anilide*: see under Mesacon- β -anilic Acid. β -*p-Toluidide*: $C_{18}H_{17}O_3N$. MW, 295. Yellowish needles from EtOH. M.p. 129–30°.

Di-phenyl ester: $C_{17}H_{14}O_4$. MW, 282. Yellowish leaflets from CS_2 . M.p. 66–7°.

α -*Benzyl ester*: $C_{12}H_{12}O_4$. MW, 220. Needles from H_2O . M.p. 71–5°.

Dibenzyl ester: $C_{19}H_{18}O_4$. MW, 310. B.p. 160–5°/0.5 mm.

α -*Amide*: $C_5H_7O_3N$. MW, 129. Cryst. from H_2O . M.p. 222°. Very sol. EtOH, Me_2CO . Spar. sol. Et_2O , C_6H_6 .

β -*Amide*: cryst. from H_2O . M.p. 174°. α -*p-Toluidide*: $C_{12}H_{14}O_2N_2$. MW, 218. Needles from H_2O . M.p. 177–8°.

Diamide: $C_5H_8O_2N_2$. MW, 128. Plates from H_2O . M.p. 176.5°.

Dichloride: $C_5H_4O_2Cl_2$. MW, 167. B.p. 64–5°/14 mm.

Hydrazide: cryst. from EtOH.Aq. M.p. 217–18° decomp.

Monoanilide: see Mesaconanilic Acid.

Dianilide: mesaconanilide. $C_{17}H_{16}O_2N_2$. MW, 280. Needles. M.p. 185.7°.

α -*p-Toluidide*: $C_{12}H_{13}O_3N$. MW, 219. Needles from H_2O . M.p. 196°.

β -p-Toluidide : needles from H_2O . M.p. 184° .
Di-p-Toluidide : $\text{C}_{18}\text{H}_{26}\text{O}_2\text{N}_2$. MW, 308.
Needles from EtOH. M.p. 212° .

Mottern, Keenan, *J. Am. Chem. Soc.*, 1931, **51**, 2347.

Anschütz, Baeumges, *Ann.*, 1928, **461**, 190.

Anschütz, *Ann.*, 1907, **353**, 144.

Perkin, *J. Chem. Soc.*, 1888, **53**, 586.

Mesaconitine

$\text{C}_{33}\text{H}_{45}\text{O}_{11}\text{N}$ MW, 631

Alkaloid accompanying aconitine. Occurs abundantly in *Aconitum Manschuricum*, Nakai. Prisms from MeOH. M.p. $208-9^\circ$ decomp. $[\alpha]_D^{17} + 25.4^\circ$.

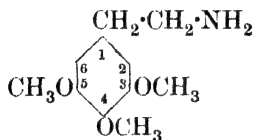
B, HBr : cryst. from H_2O . M.p. $172-3^\circ$. $[\alpha]_D - 24.8^\circ$.

B, HAuCl_4 : cryst. from $\text{CHCl}_3\text{-Et}_2\text{O}$. M.p. 160° after sintering at 154° .

B, HClO_4 : cryst. from EtOH. M.p. $217-25^\circ$ decomp.

Morio, *Ann.*, 1929, **476**, 187.

Mescaline (*Mezcaline*, β -[3 : 4 : 5-trimethoxyphenyl]-ethylamine, 5- β -aminoethylpyrogallol trimethyl ether)



$\text{C}_{11}\text{H}_{17}\text{O}_3\text{N}$ MW, 211

Cryst. M.p. $35-6^\circ$. B.p. $180-180.5^\circ/12\text{ mm}$. Sol. H_2O , EtOH, CHCl_3 , C_6H_6 . Insol. Et_2O , pet. ether.

B, HCl : cryst. M.p. 181° .

$B_2, \text{H}_2\text{SO}_4$: prisms. M.p. $183-6^\circ$.

N-Benzoyl : cryst. M.p. $120-1^\circ$.

N-m-Nitrobenzoyl : cryst. M.p. $160-1^\circ$.

Chloroplatinate : yellow needles. M.p. $187-8^\circ$.

Chloroaurate : orange needles. M.p. $140-1^\circ$ decomp.

Picrate : yellow needles. M.p. 222° ($216-18^\circ$).

Späth, *Monatsh.*, 1919, **40**, 139.

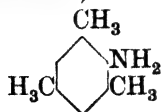
Jansen, *Rec. trav. chim.*, 1931, **50**, 617.

Slotta, Szyszk, *J. prakt. Chem.*, 1933, **137**, 339; *Ber.*, 1934, **67**, 1106.

Hahn, Wassmuth, *Ber.*, 1934, **67**, 696.

Hahn, *ibid.*, 1210.

Mesidine (*Aminomesitylene*, *mesitylamine*, 2 : 4 : 6-trimethylaniline)



$\text{C}_9\text{H}_{13}\text{N}$

MW, 135

B.p. $232-3^\circ$.

N-Acetyl : prisms from EtOH. M.p. $216-17^\circ$. Sublimes undecomp.

N-Benzoyl : needles. M.p. 204° .

N-m-Nitrobenzoyl : prisms from EtOH. M.p. $205-6^\circ$.

p-Toluenesulphonyl : needles from EtOH. M.p. 167° .

Picrate : yellow prisms from EtOH-pet. ether. M.p. $189-91^\circ$.

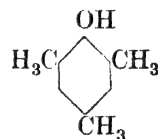
Ladenburg, *Ann.*, 1876, **179**, 172.

Fittig, Storer, *Ann.*, 1868, **147**, 3.

Hübner, v. Schack, *Ber.*, 1877, **10**, 1711.

Hey, *J. Chem. Soc.*, 1931, 1590.

Mesitol (*Hydroxymesitylene*, 2 : 4 : 6-trimethylphenol)



$\text{C}_9\text{H}_{12}\text{O}$

MW, 136

Needles. M.p. 69° . B.p. 220° . Sublimes. Volatile in steam. Sol. EtOH, Et_2O . Spar. sol. H_2O . Sol. caustic alkalis. Insol. NH_4OH , alkali carbonates. $k = 0.17 \times 10^{-10}$ at 25° . Ethyl nitrite \rightarrow 4-hydroxy-3 : 5-dimethylbenzaldehyde. KOH fusion \rightarrow 2-hydroxy-3 : 5-dimethylbenzoic acid. Dehydrogenation \rightarrow 3 : 5 : 3' : 5'-tetramethylstilbenequinone.

Me ether : 2 : 4 : 6-trimethylanisole. $\text{C}_{10}\text{H}_{14}\text{O}$. MW, 150. B.p. $200-3^\circ$. $D_4^{20} 0.9530$. $n_D^{20} 1.5016$.

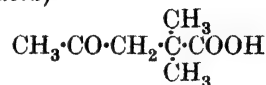
Acetyl : b.p. 236° .

Phenylurethane : m.p. $141-2^\circ$.

Porter, Thurber, *J. Am. Chem. Soc.*, 1921, **43**, 1194.

Auwers, Bundesmann, Wieners, *Ann.*, 1926, **447**, 193.

Mesitonic Acid (1 : 1-Dimethyl-levulinic acid, acetopivalic acid)



$\text{C}_7\text{H}_{12}\text{O}_3$

MW, 144

Prisms from H_2O . M.p. $75.5-76.5^\circ$. B.p. $138^\circ/15\text{ mm}$. Sol. H_2O , EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin. NaOBr \rightarrow 1 : 1-dimethylsuccinic acid. Dil. $\text{HNO}_3 \rightarrow$ dimethylmalonic acid.

Et ester : $\text{C}_9\text{H}_{16}\text{O}_3$. MW, 172. B.p. 210° .

Oxime : cryst. from C_6H_6 . M.p. $93-4^\circ$. Very sol. H_2O , EtOH, Et_2O . Sol. C_6H_6 .

Semicarbazone: cryst. from EtOH.Aq. M.p. 197.5° decomp.

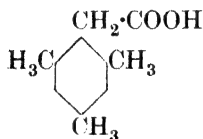
Phenylhydrazone: cryst. from EtOH. M.p. 135°.

Lapworth, *J. Chem. Soc.*, 1904, **85**, 1220.

Toivonen, *Ann.*, 1919, **419**, 208.

Wallach, Kempe, *Ann.*, 1903, **329**, 99.

Mesitylacetic Acid (2 : 4 : 6-Trimethylphenylacetic acid)



$C_{11}H_{14}O_2$

MW, 178

Needles from ligroin or EtOH.Aq. M.p. 166–8° (164°). Sol. hot H_2O , EtOH, Et_2O . Sublimes in needles.

Me ester: $C_{12}H_{16}O_2$. MW, 192. B.p. 255–6°.

Amide: $C_{11}H_{15}ON$. MW, 177. Plates from H_2O . M.p. 209–10°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$.

Willgerodt, Scholtz, *J. prakt. Chem.*, 1910, **81**, 386.

Meyer, Sudborough, *Ber.*, 1894, **27**, 1587.

Mesityl Aldehyde.

See 2 : 4 : 6-Trimethylbenzaldehyde.

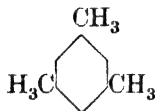
Mesitylamine.

See 3 : 5-Dimethylbenzylamine and Mesidine.

Mesityl bromide.

Bromomesitylene, *q.v.*

Mesitylene (1 : 3 : 5-Trimethylbenzene)



C_9H_{12}

MW, 120

Colourless liq. M.p. – 53.5° (– 54.4°). B.p. 164.8–164.9°. $D_4^{17.0}$ 0.8646, D_4^{20} 0.8634. n_D^{20} 1.4967.

Picrate: yellow cryst. M.p. 96.6°.

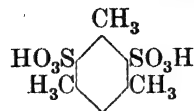
Ipat'ev, Dolgov, Volnov, *Ber.*, 1930, **63**, 3072.

Baril, Hauber, *J. Am. Chem. Soc.*, 1931, **53**, 1087.

Adams, Hufferd, *Organic Syntheses*, Collective Vol. I, 334.

Tishchenko, *Bull. soc. chim.*, 1933, **53**, 1428.

Mesitylene-disulphonic Acid



$C_9H_{12}O_6S_2$

MW, 280

Hygroscopic needles.

Na salt: needles + $1\frac{1}{2}H_2O$.

K salt: needles + $2H_2O$ from 80–90% EtOH.

Cu salt: green needles. Decomp. at 120–30°.

Ba salt: needles + $3H_2O$ from H_2O . Decomp. at 115°.

Di-phenyl ester: m.p. 110–11°.

Diamide: $C_9H_{14}O_4N_2S_2$. MW, 278. Cryst. M.p. 244°.

Dichloride: $C_9H_{10}O_4Cl_2S_2$. MW, 317. M.p. 125°.

Dianilide: m.p. 150–1°.

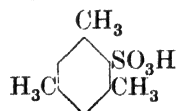
Hollemann, Choufoer, Alozevy, *Rec. trav. chim.*, 1929, **48**, 1075.

Barth, Hertzog, *Monatsh.*, 1880, **1**, 808.

Steinkopf *et al.*, *J. prakt. Chem.*, 1927, **117**, 43.

Backer, *Rec. trav. chim.*, 1935, **54**, 544.

Mesitylene-sulphonic Acid



$C_9H_{12}O_3S$

MW, 200

Cryst. from $CHCl_3$. M.p. 78°. Sol. 50% H_2SO_4 , warm HCl , $CHCl_3$. Decomp. slowly at 60°.

Amide: $C_9H_{13}O_2NS$. MW, 199. Needles from H_2O or EtOH. M.p. 141–2°. Sublimes.

Methylamide: $C_{10}H_{15}O_2NS$. MW, 213. Needles from EtOH. M.p. 89–90°.

Dimethylamide: $C_{11}H_{17}O_2NS$. MW, 227. Needles from EtOH.Aq. M.p. 45°.

Ethylamide: cryst. from EtOH. M.p. 75°.

Fluoride: $C_9H_{11}O_2FS$. MW, 202. M.p. 73–73.5°. B.p. 125°/12 mm.

Chloride: $C_9H_{11}O_2ClS$. MW, 218.5. Plates from Et_2O . M.p. 57°. Very sol. EtOH, Et_2O .

See last two references above and also Schreinemakers, *Rec. trav. chim.*, 1897, **16**, 415.

Meyer, *Monatsh.*, 1913, **34**, 573.

Smith, Cass, *J. Am. Chem. Soc.*, 1932, **54**, 1606.

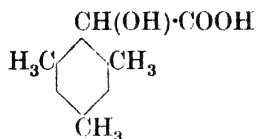
Mesitylenic Acid.

See 3 : 5-Dimethylbenzoic Acid.

Mesitylenic Aldehyde.

See 3 : 5-Dimethylbenzaldehyde.

Mesitylglycollic Acid (2 : 4 : 6-Trimethylmandelic acid, 2 : 4 : 6-trimethylphenylglycollic acid)



$C_{11}H_{14}O_3$

MW, 194

Plates from H_2O . M.p. 152° (147°). Sol. EtOH, Et₂O. Spar. sol. cold H_2O . Conc. $H_2SO_4 \rightarrow$ intense red sol.

Me ester: $C_{12}H_{16}O_3$. MW, 208. Cryst. from ligroin. M.p. 92° .

Feith, *Ber.*, 1891, **24**, 3545.

Meyer, Molz, *Ber.*, 1897, **30**, 1274.

Mesitylglyoxylic Acid.

See 2 : 4 : 6-Trimethylbenzoylformic Acid.

Mesityl oxide (Isopropylidene-acetone, 2-methyl-2-pentenone-4, 4-keto-2-methylpentene-2)



$C_6H_{10}O$

MW, 98

B.p. $130-1^\circ$, $129.5-130^\circ/750$ mm., $62.5^\circ/82$ mm., $50^\circ/37$ mm., $41^\circ/23$ mm., $34-5^\circ/11$ mm. D_4^{20} 0.86532, D_4^{25} 0.8510, D_4^{22} 0.7590. n_D^{13} 1.44478, n_D^{15} 1.44840.

Oxime: α -form, b.p. $84^\circ/11$ mm. D_4^{20} 0.876. n_D^{20} 1.450. *Acetyl*: b.p. $101^\circ/11$ mm. D_4^{20} 0.986. n_D^{20} 1.474. β -Form: b.p. $95^\circ/11$ mm. D_4^{20} 0.881. n_D^{20} 1.462. *Acetyl*: b.p. $107^\circ/14$ mm. D_4^{20} 0.990. n_D^{20} 1.478.

Semicarbazone: α -form, cryst. from C_6H_6 . M.p. 164° . Exposure to ultra-violet light \rightarrow β -form (partly). β -Form: cryst. from C_6H_6 . M.p. $133-4^\circ$.

p-Nitrophenylhydrazone: orange needles from EtOH.Aq. M.p. 207° .

2 : 4-Dinitrophenylhydrazone: carmine cryst. from EtOH. M.p. 200° .

Semi-oxamazone: cryst. from EtOH. M.p. $163-4^\circ$.

Dichloride: see Methyl 1 : 2-dichloroisobutyl Ketone.

Hydrobromide: see Methyl 2-bromoisobutyl Ketone.

Wilson, Pickering, *J. Chem. Soc.*, 1923, **123**, 394.

Wilson, Heilbron, *J. Chem. Soc.*, 1913, **103**, 379.

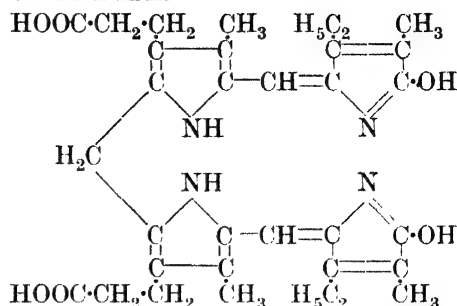
Auwers, Ottens, *Ber.*, 1924, **57**, 446.

Allen, *J. Am. Chem. Soc.*, 1930, **52**, 2958.

Conant, Tuttle, *Organic Syntheses*, Collective Vol. I, 338.

Dict. of Org. Comp.—II.

Mesobilirubin



$C_{33}H_{40}O_6N_4$

MW, 588

Needles from Py or prisms from $CHCl_3$. M.p. 315° decomp. Spar. sol. most org. solvents except Py or $CHCl_3$.

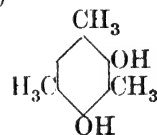
Di-Me ester, hydrochloride: $C_{35}H_{44}O_6N_4 \cdot 2HCl$. MW, 689. Cryst. M.p. 190° .

Fischer, Niemann, *Z. physiol. Chem.*, 1923, **127**, 317.

Fischer, Hess, *Z. physiol. Chem.*, 1931, **194**, 193.

Fischer, Adler, *Z. physiol. Chem.*, 1931, **200**, 209.

Mesorcinol (Dihydroxymesitylene, 2 : 4 : 6-trimethylresorcinol)



$C_9H_{12}O_2$

MW, 152

Plates. M.p. $149-50^\circ$. B.p. $274.5-275.5^\circ$. Very sol. EtOH, Et₂O. Sol. C_6H_6 . Spar. sol. H_2O .

Diacetyl: plates from EtOH. M.p. 63° . B.p. 305° decomp. Very sol. EtOH, Et₂O. Spar. sol. H_2O .

Knecht, *Ann.*, 1882, **215**, 100.

Mesotan (Methoxymethyl salicylate, methylene-glycol methyl ether salicylate)



$C_9H_{10}O_4$

MW, 182

Oil. B.p. $162^\circ/42$ mm., $153^\circ/32$ mm. Misc. with EtOH, Et₂O, $CHCl_3$, C_6H_6 , and fats. Spar. sol. H_2O . Dil. acids \rightarrow salicylic acid + formaldehyde + methyl alcohol.

Bayer, D.R.P., 137,585, (*Chem. Zentr.*, 1903, i, 112).

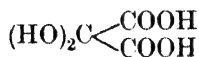
Eichengrün, *Chem. Zentr.*, 1902, II, 1387.

Mesotartaric Acid

See under Tartaric Acid.

Mesoxalic Acid (*Ketomalonic acid, dihydroxymalonic acid*)

(i)



(ii)

 $\text{C}_3\text{H}_2\text{O}_5$ ($\text{C}_3\text{H}_4\text{O}_6$)

MW, 118 (136)

Exists in free state as dihydroxymalonic acid (ii). Cryst. M.p. 121° ($119-21^\circ$). Very sol. EtOH, Et₂O. Reduces NH₃·AgNO₃. KMnO₄ → oxalic acid. Conc. KOH → oxalic acid + formic acid. NaHg → tartronic acid. Boiling H₂O → glyoxylic acid + CO₂.

Hydrazone: cryst. from C₆H₆-pet. ether. M.p. 80° . B.p. $100^\circ/0.15$ mm.

Oxime: see Isonitrosomalonic Acid.

Phenylhydrazone: cryst. from EtOH. M.p. $160-4^\circ$.

o-Chlorophenylhydrazone: yellow prisms. M.p. 187° .

p-Chlorophenylhydrazone: yellow prisms. M.p. $192-3^\circ$.

2:4-Dichlorophenylhydrazone: yellow prisms. M.p. 188° .

2:4:6-Trichlorophenylhydrazone: yellow cryst. M.p. 182° .

p-Bromophenylhydrazone: yellow prisms. Decomp. without melting.

2:4-Dibromophenylhydrazone: yellow prisms. M.p. 205° .

p-Nitrophenylhydrazone: m.p. 202° .

o-Tolylhydrazone: yellow prisms. M.p. $171-2^\circ$.

p-Tolylhydrazone: yellow prisms. M.p. 178° .

Di-Et acetal: diethoxymalonic acid. C₇H₁₂O₆. MW, 192. Needles from C₆H₆. M.p. 160° .

Very sol. H₂O, EtOH, Et₂O. Spar. sol. C₆H₆. *Di-Et ester*: C₁₁H₂₀O₆. MW, 248. Plates from EtOH. M.p. $43-4^\circ$. B.p. $228^\circ/762$ mm.

Di-Me ester: ketomalonic, C₅H₈O₅. MW, 146. Oil. B.p. $106^\circ/40$ mm. D₄²⁰ 1.2464. *Dihydroxymalonic*: C₅H₈O₆. MW, 164. Cryst. from C₆H₆ or pet. ether. M.p. 81° . Very sol. H₂O. Sol. EtOH, Et₂O, C₆H₆.

Di-Et ester: ketomalonic, C₇H₁₀O₅. MW, 174. Oil. B.p. $117^\circ/31$ mm., $105-7^\circ/19$ mm. D₄¹⁵ 1.1419. n_D¹⁵ 1.419. *Hydrazone*: plates or prisms from C₆H₆. M.p. 78° . B.p. $176^\circ/20$ mm. 2:4-Dinitrophenylhydrazone: yellow cryst. M.p. 128° . *Dihydroxymalonic*: C₇H₁₂O₆. MW, 192. Cryst. from C₆H₆. M.p. 57° . Very sol. H₂O. Sol. EtOH, Et₂O, CHCl₃. Spar. sol. ligroin,

C₆H₆. *Diacetyl*: needles from Et₂O. M.p. 145° decomp.

Dianilide: yellow powder. M.p. 190° after sintering at 163° .

Di-o-toluidide: needles from H₂O. M.p. $127-31^\circ$.

Di-p-toluidide: yellow powder. M.p. 187° .

Auwers, Marburg, *Ber.*, 1918, 51, 1116.

Staudinger, Hammet, *Helv. chim. acta*, 1921, 4, 217.

Chattaway, Harris, *J. Chem. Soc.*, 1922, 121, 2703.

Auwers, Heyna, *Ann.*, 1923, 434, 165.

Stevens, Ward, *J. Chem. Soc.*, 1924, 125, 1324.

Gilman, Johnson, *J. Am. Chem. Soc.*, 1928, 50, 3341.

Corson, Hazen, *Organic Syntheses*, 1930, X, 54.

Nef, *Ann.*, 1892, 270, 315.

Curtiss, *Am. Chem. J.*, 1906, 35, 478.

Conrad, Reinbach, *Ber.*, 1902, 35, 1819.

Mesoxalic Dialdehyde $\text{C}_3\text{H}_2\text{O}_3$

MW, 86

Not known in the free state. Sol. H₂O. Reduces Fehlings.

Hydrate: C₃H₄O₄. MW, 104. Viscous syrup.

Dioxime: see Di-isonitrosoacetone.

p-Nitrophenylhydrazone: brown plates from EtOH. M.p. 178° .

Harries, Turk, *Ann.*, 1910, 374, 352.

Mesoxalylurea.

See Alloxan.

Metaboranilide.

See Boranilide.

Metacrolein $\text{C}_9\text{H}_{12}\text{O}_3$

MW, 168

Plates from EtOH. M.p. 50° ($45-6^\circ$). Sol. EtOH, Et₂O. Very spar. sol. hot H₂O. Volatile in steam. Very feeble aldehydic properties. Dry HCl → 2-chloropropionaldehyde. Conc. HCl → acrolein.

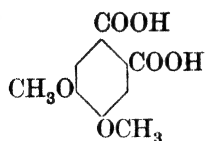
Geuther, Cartmell, *Ann.*, 1859, 112, 6.

Grimaux, Adam, *Compt. rend.*, 1881, 92, 301.

Metaformaldehyde.

See Trioxymethylene.

Metahemipinic Acid (4:5-Dimethoxyphthalic acid, veratrol-4:5-dicarboxylic acid)


 $C_{10}H_{10}O_6$

MW, 226

Needles from conc. aq. sol. Prisms + $2H_2O$ from dil. aq. sol. M.p. $174-5^\circ$ ($179-82^\circ$ rapid heat.). Spar. sol. H_2O . $k = 1.4 \times 10^{-3}$ at 25° . $HI + P \rightarrow$ 4:5-dihydroxyphthalic acid. Conc. $HNO_3 \rightarrow$ 4:5-dinitroveratrol. KOH fusion \rightarrow protocatechuic acid.

Mono-Et ester: $C_{12}H_{14}O_6$. MW, 254. Cryst. from EtOH. M.p. 127° .

Di-Et ester: $C_{14}H_{18}O_6$. MW, 282. Oil. Sol. EtOH, Et_2O .

Mono-Et amide: $C_{12}H_{15}O_5N$. MW, 253. Cryst. from EtOH. Decomp. on heating.

Anhydride: $C_{10}H_8O_5$. MW, 208. M.p. 175° .

Rossin, *Monatsh.*, 1891, **12**, 489, 499.

Goldschmidt, *Monatsh.*, 1888, **9**, 339.

Perkin, Weizmann, *J. Chem. Soc.*, 1906, **89**, 1651.

Mason, Perkin, *J. Chem. Soc.*, 1914, **105**, 2020.

Meldrum, Parikh, *Brit. Chem. Abstracts*, 1935, 619.

Metaldehyde

 $(C_2H_4O)_n$
 $(C_2H_4O)_n$

MW, (44)_n

Polymer of acetaldehyde. The degree of polymerisation, n , varies from 4 (in phenol) to 6 (in thymol).

Needles or prisms from EtOH. M.p. 246.2° . Sol. hot $CHCl_3$. Spar. sol. EtOH, Et_2O , C_6H_6 , cold $CHCl_3$. Sublimes. Dil. $H_2SO_4 \rightarrow$ acetaldehyde. $Cl \rightarrow$ chloral. Does not form derivs. with hydroxylamine.

Haushofer, *Jahresber. Fortschr. Chem.*, 1882, 362.

Smits, De Leeuw, *Z. physik. Chem.*, 1911, **77**, 269.

Kekulé, Zincke, *Ann.*, 1872, **162**, 146.

Hanriot, Oeconomidès, *Ann. Chim.*, 1882, **25**, 227.

Metanethole.

See under Anethole.

Metanilic Acid.

See Aniline-*m*-sulphonic Acid.

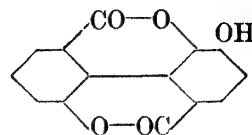
Metasaccharic Acid.

See under Mannosaccharic Acid.

Metastyrene.

See under Styrene.

Metallagic Acid


 $C_{14}H_6O_5$

MW, 254

Needles from AcOH. M.p. $273-6^\circ$. Sublimes. Sol. hot Py. Alkalis \rightarrow yellow col.

Acetyl: leaflets. M.p. $269-71^\circ$.

Perkin, Nierenstein, *J. Chem. Soc.*, 1905, **87**, 1426.

Meteloidine

 $C_{13}H_{21}O_4N$

MW, 255

Alkaloid from *Datura meteloides*. Needles from C_6H_6 . M.p. $141-2^\circ$. Sol. EtOH, $CHCl_3$. Spar. sol. H_2O , Et_2O , C_6H_6 . $Ba(OH)_2 \rightarrow$ tiglic acid + teloidine.

B.HBr: needles + $2H_2O$. M.p. 250° .

B.HAuCl_4: needles + $\frac{1}{2}H_2O$. M.p. $149-50^\circ$.

Picrate: plates. M.p. $177-80^\circ$.

Pyman, Reynolds, *J. prakt. Chem.*, 1901, **64**, 274.

Methacetin.

p-Acetanisidide. See under *p*-Anisidine.

Methacrylic Acid.

See 1-Methylacrylic Acid.

Methanal.

See Formaldehyde.

Methane (Marsh gas)

 CH_4
 CH_4

MW, 16

Occurs widely distributed in nature. Colourless gas. Liq. at -11° and 180 atm. Solidifies in liquid air. Needles. M.p. -184° . B.p. $-164^\circ/760$ mm., $-130.9^\circ/6.7$ atm., $-113.4^\circ/16.4$ atm. D_0^{20} 0.5547, D^{184} 0.466 (air = 1). Sol. H_2O , MeOH, most org. solvents. Sp. heat 8.50 Cal./mol at 15° , 8.08 Cal./mol at -80° . Dielectric constant 1.00212 at -154° and 760 mm., 1.000886 at 0° and 760 mm. Stable at 480° . At $1000^\circ \rightarrow C + H_2O$. Decomp. at $470-570^\circ$ in presence of Ni or CO. Forms explosive mixtures with air. O_3 at $100^\circ \rightarrow H \cdot CHO + H \cdot COOH$. Reacts with F at -187° . Cl in sunlight $\rightarrow CH_3Cl$, CH_2Cl_2 , $CHCl_3$, and

CCl_4 , COCl_2 in presence of C at $400^\circ \longrightarrow \text{CH}_3\text{Cl}$.

Moissan, Chavanne, *Compt. rend.*, 1905, **140**, 409.

Wroblewski, *Jahresber. Fortschr. Chem.*, 1884, 197.

Heuse, *Ann. phys.*, 1919, **59**, 92.

Bone, Coward, *J. Chem. Soc.*, 1908, **93**, 1206.

Mayer, Altmayer, *Ber.*, 1907, **40**, 2139.

Hansmann, D.R.P., 214,155, (*Chem. Zentr.*, 1909, II, 1510).

Drugman, *J. Chem. Soc.*, 1904, **89**, 941.

Walter, D.R.P., 222,919, (*Chem. Zentr.*, 1910, II, 255).

Hochstetter, D.R.P., 292,089, (*Chem. Zentr.*, 1916, II, 39).

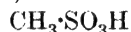
Methane Base.

See 4 : 4'-Tetramethyldiaminodiphenylmethane.

Methane-disulphonic Acid.

See Methionie Acid.

Methane-sulphonic Acid (*Methylsulphonic acid, sulphomethane*)



$\text{CH}_4\text{O}_3\text{S}$ MW, 96

B.p. $167\text{--}167.5^\circ/10$ mm. D_4^{18} 1.4812. Electrolysis $\longrightarrow \text{CO}_2$, K_2SO_4 , and $\text{K}_2\text{S}_2\text{O}_8$. Heat in strong acid sol. \longrightarrow formaldehyde.

NH_4 salt : plates. Sol. H_2O .

Me ester : $\text{C}_2\text{H}_6\text{O}_3\text{S}$. MW, 110. B.p. $202.7\text{--}203^\circ/748$ mm. D_0^{18} 1.3206.

Et ester : $\text{C}_3\text{H}_8\text{O}_3\text{S}$. MW, 124. B.p. $85\text{--}6^\circ/10$ mm. Spar. sol. H_2O .

Anhydride : $\text{C}_2\text{H}_6\text{O}_5\text{S}_2$. MW, 174. Prisms from Et_2O . M.p. 71° . B.p. $138^\circ/10$ mm. Sol. CHCl_3 , C_6H_6 , hot Et_2O .

Chloride : $\text{CH}_3\text{O}_2\text{ClS}$. MW, 114.5. B.p. $161\text{--}161.5^\circ/730$ mm. D_4^{18} 1.48053. Insol. H_2O .

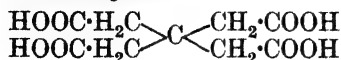
Amide : $\text{CH}_5\text{O}_2\text{NS}$. MW, 95. Prisms from H_2O . M.p. 88° .

Billeter, *Ber.*, 1905, **38**, 2013.

Fichter, Lichtenhahn, *Ber.*, 1915, **48**, 1961.

Arbusow, *J. Russ. Phys.-Chem. Soc.*, 1909, **41**, 444.

Methane-tetracetic Acid (2 : 2-Di-[carboxymethyl]-glutaric acid, tetracarboxytetramethylmethane, tetramethylmethane-tetracarboxylic acid)



$\text{C}_9\text{H}_{12}\text{O}_8$ MW, 248

Rhombohedral from H_2O . M.p. 248° . Sol. Me_2CO . Spar. sol. Et_2O .

Tetra-Me ester : $\text{C}_{13}\text{H}_{20}\text{O}_8$. MW, 304. M.p. 23° . B.p. $192\text{--}5^\circ/12$ mm.

Tetra-Et ester : $\text{C}_{17}\text{H}_{28}\text{O}_8$. MW, 360. B.p. $211^\circ/20$ mm.

Tetrapropyl ester : $\text{C}_{21}\text{H}_{36}\text{O}_8$. MW, 416. B.p. $212\text{--}13^\circ/5$ mm.

Tetracyclohexyl ester : $\text{C}_{33}\text{H}_{52}\text{O}_8$. MW, 576. Needles from EtOH . M.p. 73.5° .

Tetraphenyl ester : $\text{C}_{33}\text{H}_{28}\text{O}_8$. MW, 552. Leaflets from EtOH . M.p. 116.5° . Very sol. C_6H_6 , CHCl_3 . Sol. EtOH , Et_2O . Spar. sol. pet. ether. Insol. H_2O . Non-volatile in steam.

Tetra-p-nitrophenyl ester : m.p. about 100° .

Tetra-p-tolyl ester : cryst. from EtOH . M.p. 127° .

Tetra-1-naphthyl ester : $\text{C}_{49}\text{H}_{36}\text{O}_8$. MW, 752. Pale yellow needles from $\text{EtOH}\text{--}\text{C}_6\text{H}_6$. M.p. 148° .

Tetra-2-naphthyl ester : yellow needles from $\text{EtOH}\text{--}\text{toluene}$. M.p. 171.5° .

Tetramenthyl ester : needles from EtOH . M.p. $82\text{--}3^\circ$.

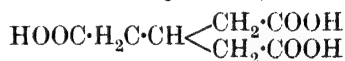
Tetrachloride : $\text{C}_9\text{H}_8\text{O}_4\text{Cl}_4$. MW, 322. Cryst. M.p. about 45° .

Dianhydride : plates from $\text{Me}_2\text{CO}\text{--}\text{CHCl}_3$. M.p. 284° .

Ingold, Nickolls, *J. Chem. Soc.*, 1922, **121**, 1645.

Backer, *Rec. trav. chim.*, 1935, **54**, 62.

Methane-triacetic Acid (*Isobutane-tricarboxylic acid, 2-carboxymethylglutaric acid, trimethylmethane-tricarboxylic acid*)



$\text{C}_7\text{H}_{10}\text{O}_6$ MW, 190

Prisms from Et_2O . M.p. 126° (115°). Sol. H_2O , conc. HCl .

Di-Et ester : $\text{C}_{11}\text{H}_{18}\text{O}_6$. MW, 246. *Nitrile* : $\text{C}_{11}\text{H}_{17}\text{O}_4\text{N}$. MW, 227. B.p. $158\text{--}60^\circ/15$ mm.

Tri-Et ester : $\text{C}_{13}\text{H}_{22}\text{O}_6$. MW, 274. B.p. $172\text{--}3^\circ/14$ mm.

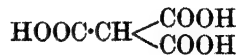
Dianilide : $\text{C}_{19}\text{H}_{20}\text{O}_4\text{N}_2$. MW, 340. Needles from AcOH . M.p. 206° (192°).

Ingold, *J. Chem. Soc.*, 1921, **119**, 352.

Dreifuss, Ingold, *J. Chem. Soc.*, 1923, **123**, 2964.

Kohler, Reid, *J. Am. Chem. Soc.*, 1925, **47**, 2808.

Methane-tricarboxylic Acid (*Carboxymalonic acid*)



$\text{C}_4\text{H}_4\text{O}_6$ MW, 148

Tri-Me ester: $C_7H_{10}O_6$. MW, 190. Prisms from MeOH. M.p. $45-6^\circ$. B.p. 242.7° , $128^\circ/15$ mm. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Sol. dil. alkalis. $FeCl_3 \rightarrow$ reddish-brown col.

Di-Et ester: $C_8H_{12}O_6$. MW, 204. Decomp. at ord. temps. \rightarrow malonic ester.

Tri-Et ester: $C_{10}H_{16}O_6$. MW, 232. Cryst. M.p. $27-9^\circ$. B.p. $139^\circ/14$ mm. $D_4^{14.5}$ 1.1091. $n_D^{14.5}$ 1.42828.

Di-Me mono-Et ester: $C_8H_{12}O_6$. MW, 204. Oil. B.p. $240-1^\circ$, $138-9^\circ/12$ mm.

Trinitrile: see Cyanoforn.

Mononitrile di-Et ester: $C_8H_{11}O_4N$. MW, 185. B.p. $120-30^\circ/25$ mm. Sol. EtOH, Et_2O , alkalis. Spar. sol. H_2O . D_4^{20} 1.0931. n_D^{20} 1.4263. $k = 3.6 \times 10^{-2}$ at 25° . $KOH \rightarrow NH_3 +$ malonic acid.

Scholl, Egerer, *Ann.*, 1913, **397**, 362.

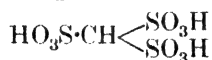
Staudinger, Hirzel, *Ber.*, 1917, **50**, 1033; 1916, **49**, 2528.

Auwers, Auffenberg, *Ber.*, 1918, **51**, 1098.

Haller, *Compt. rend.*, 1890, **111**, 54.

Haller, Muller, *Compt. rend.*, 1904, **138**, 445; **139**, 1182.

Methane-trisulphonic Acid



$(CH_4O_9S_3)$ MW, 256

Needles + $4H_2O$ from H_2O . M.p. $150-3^\circ$. Sol. H_2O , EtOH. Aq. sol. stable to HNO_3 and Cl.

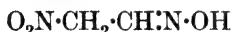
Bagnall, *J. Chem. Soc.*, 1899, **75**, 278.

Theilkukl, *Ann.*, 1868, **147**, 134.

Methanol.

See Methyl Alcohol.

Methazonic Acid (Nitro-acetaldoxime)



$C_2H_4O_3N_2$ MW, 104

Plates from Et_2O , prisms from C_6H_6 , leaflets from $CHCl_3$. M.p. $79-80^\circ$. Sol. H_2O , EtOH, Et_2O , Me_2CO , hot C_6H_6 , hot $CHCl_3$. Decomp. on standing. Red. $\rightarrow NH_3 + H \cdot COOH$. HCl in $Et_2O \rightarrow$ chloro-*anti*-glyoxime. $C_6H_5 \cdot NH_2$, HCl \rightarrow hydroxylamine + nitroethylideneaniline. $C_6H_5 \cdot NH \cdot NH_2$, HCl \rightarrow nitroacetaldehyde phenylhydrazone.

Anhydride: see Isocyanilic Acid.

Schultze, *Ber.*, 1896, **29**, 2288.

Dunstan, Goulding, *J. Chem. Soc.*, 1900, **77**, 1264.

Meister, *Ber.*, 1907, **40**, 3435.

Steinkopf, *J. prakt. Chem.*, 1910, **81**, 224.

Methebenin.

See under Thebenin.

Methebenol.

See under Thebenol.

1-Methinyl-3-propinyl-propane.

See 1 : 5-Heptadi-ine.

Methionic Acid (Methane-disulphonic acid)



$CH_4O_6S_2$ MW, 176

Needles. Decomp. on dist. in high vacuum. At $220-70^\circ$ and $15-20$ mm. $\rightarrow CO_2$, H_2SO_4 , $H_2S_2O_8$, and O_3 .

Di-Me ester: $C_3H_8O_6S_2$. MW, 204. Needles. M.p. 47° . B.p. $194-200^\circ/16$ mm. Sol. $CHCl_3$, C_6H_6 . Spar. sol. Et_2O . Hyd. by hot H_2O .

Di-Et ester: $C_5H_{12}O_6S_2$. MW, 232. Needles from C_6H_6 -pet. ether. M.p. $28-9^\circ$.

Di-phenyl ester: see Methionol.

Di-o-tolylester: *o*-cresomethionol. $C_{15}H_{16}O_6S_2$. MW, 356. Needles from EtOH. M.p. 84° .

Di-m-tolyl ester: *m*-cresomethionol. Cryst. from EtOH. M.p. 56° .

Di-p-tolyl ester: *p*-cresomethionol. Cryst. from EtOH. M.p. 84° .

Dichloride: $CH_2O_4Cl_2S_2$. MW, 213. Exists in two forms. (i) M.p. 8° . B.p. $133^\circ/10$ mm. D_4^{22} 1.821. Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. CCl_4 . (ii) Needles or prisms from CCl_4 . M.p. $36-7^\circ$.

Diamide: $CH_6O_4N_2S_2$. MW, 174. Plates from AcOH. M.p. 233° . Sol. NaOH.

Dianilide: $C_{13}H_{14}O_4N_2S_2$. MW, 326. Cryst. M.p. $192-3^\circ$. *Diacetyl*: cryst. from Ac_2O . M.p. $196-7^\circ$. *Dibenzoyl*: cryst. from Me_2CO . M.p. $204-5^\circ$.

Di-p-nitroanilide: $C_{13}H_{12}O_8N_4S_2$. MW, 416. Yellow prisms from EtOH. M.p. $248-9^\circ$ decomp.

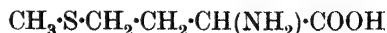
Di-phenylhydrazide: needles from EtOH. M.p. $118-19^\circ$ decomp.

Di-benzoylhydrazide: needles from EtOH. M.p. $204-5^\circ$ decomp.

Schroeter, *Ann.*, 1919, **418**, 161.

Backer, *Rec. trav. chim.*, 1929, **48**, 989.

Methionine (3-Methylmercapto-1-amino-butyric acid)



$C_5H_{11}O_2NS$ MW, 149

l.

Hydrolysis product of casein. M.p. 283° decomp., after shrinking and darkening at 278° . $[\alpha]_D^{25} - 6.87^\circ$ in H_2O .

N-Formyl: cryst. from EtOH-pet. ether. M.p. $98-9^\circ$. $[\alpha]_D^{25} - 10.0^\circ$ in H_2O .

p-Tolylurea deriv.: cryst. from EtOH. M.p. 157–8°.

α-Naphthylurea deriv.: m.p. 187–8°.

d.-

$[\alpha]_D^{25} + 8.12^\circ$ in H₂O.

dl.-

M.p. 281° (272°).

N-Formyl: cryst. from AcOEt. M.p. 99–100°.

N-Benzoyl: cryst. from EtOH.Aq. M.p. 143–5°.

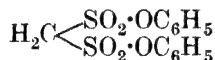
Picrolonate: m.p. 179–80°.

Windus, Marvel, *J. Am. Chem. Soc.*, 1931, **53**, 3490.

Barger, Weichselbaum, *Organic Syntheses*, 1934, XIV, 58.

Mueller, *J. Biol. Chem.*, 1923, **56**, 157.

Methionol (Methiononic acid diphenyl ester)



C₁₃H₁₂O₆S₂ MW, 328

Needles from CCl₄. M.p. 82°. Sol. EtOH, Et₂O, C₆H₆; CHCl₃. Spar. sol. pet. ether, H₂O. Sol. dil. alkalis and conc. NH₃. Pptd. unchanged from alk. sol. by dil. acids. Forms metallic salts.

C-Benzoyl: m.p. 96°.

Schroeter, *Ann.*, 1919, **418**, 204, 235.

Methone.

See 1: 1-Dimethylcyclohexanedione-3: 5.

Methose.

See α-Acrose.

Methoxyacetic Acid (Glycollic acid methyl ether)



C₃H₆O₃ MW, 90

B.p. 203–4°, 96.5°/13 mm. D₄²⁰ 1.1768. n_D²⁰ 1.41677. k = 2.94 × 10⁻⁴ at 25°. Electrolysis → formaldehyde and formic acid.

Me ester: C₄H₈O₃. MW, 104. B.p. 131°. D₁₅¹⁵ 1.0578. n_D²⁰ 1.39636.

Et ester: C₅H₁₀O₃. MW, 118. B.p. 143.9°/747 mm. D₁₅¹⁵ 1.0118.

Propyl ester: C₆H₁₂O₃. MW, 132. B.p. 165°. D₁₅¹⁵ 0.9897.

Amide: C₃H₇O₂N. MW, 89. Cryst. from H₂O. M.p. 96.5° (92°).

Nitrile: C₃H₅ON. MW, 71. B.p. 120°. D₄²⁸ 0.9373. n_D²⁸ 1.380. Insol. H₂O. Sol. acids and alkalis.

Anhydride: C₆H₁₀O₅. MW, 162. B.p. 124–8°/20 mm.

Anilide: C₉H₁₁O₂N. MW, 165. Needles from pet. ether. M.p. 58°. B.p. 185–8°/40 mm.

Lambling, *Bull. soc. chim.*, 1897, **17**, 357.

Palomaa, *Chem. Zentr.*, 1912, II, 596; 1913, II, 1959; *Ber.*, 1909, **42**, 1300.

Gauthier, *Ann. chim. phys.*, 1909, **16**, 302.

Saarrow, Allen, *Organic Syntheses*, 1933, XIII, 56.

Methoxyacetone (Acetol methyl ether, methyl acetonyl ether, acetyldimethyl ether)



C₄H₈O₂ MW, 88

Colourless liq. B.p. 114°/732 mm. D₂₀ 0.9570. Sol. H₂O and most org. solvents. Reduces Fehling's. Forms add. comps. with rare earths.

p-Nitrophenylhydrazine: yellow needles from C₆H₆-ligroin. M.p. 101–2°.

Gauthier, *Ann. chim. phys.*, 1908, **16**, 318.

Henry, *Compt. rend.*, 1904, **138**, 971.

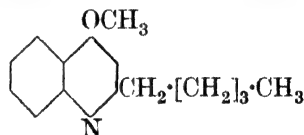
Methoxyacetophenone.

See under Hydroxyacetophenone and Phenacyl Alcohol.

4-Methoxy-1-allylbenzene.

See Esdragol.

4-Methoxy-2-n-amylquinoline



C₁₅H₁₉ON MW, 229

Constituent of alkaloids of *Cusparia trifoliata*. Oil. B.p. 190–200°/14 mm.

B₂, H₂PtCl₆: m.p. 220° (in vacuum).

Picrate: cryst. from MeOH. M.p. 132°.

Späth, Pikl, *Ber.*, 1929, **62**, 2244; *Monatsh.*, 1930, **55**, 352.

Methoxyanthranilic Acid.

See under Hydroxyanthranilic Acid.

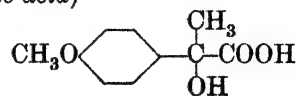
Methoxyanthraquinone.

See under Hydroxyanthraquinone.

Methoxyanthrone.

See under Oxanthranol.

p-Methoxyatrolactic Acid (l-p-Methoxyphenyl-lactic acid)



C₁₀H₁₂O₄ MW, 196.

d.-

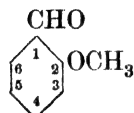
Cryst. from C₆H₆. M.p. 146–7°. $[\alpha]_D^{25} + 61.0^\circ$ in EtOH.

l.

Needles from EtOH. M.p. 146–7°. $[\alpha]_{\text{D}}^{25}$ — 61.7° in EtOH.

McKenzie, Ritchie, *Biochem. Z.*, 1932, 250, 376.

o-Methoxybenzaldehyde (*Salicylaldehyde methyl ether*)



$\text{C}_8\text{H}_8\text{O}_2$ MW, 136

Prisms. M.p. 36.3°. B.p. 236°, 124–5°/18 mm. D_4^{20} 1.1445, D_{15}^{20} 1.1354, $D_4^{20.2}$ 1.1326. Sol. Et_2O , CHCl_3 . Spar. sol. EtOH, C_6H_6 . Insol. H_2O . n_{D}^{20} 1.560. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ yellow sol.

Oxime: exists in two forms. (i) Needles from EtOH.Aq. M.p. 92°. *Me ether*: liq. B.p. 125–7°/16 mm. Volatile in steam. *Acetyl*: cryst. from Et_2O . M.p. 40°. 2 : 4-Dinitrophenyl ether: m.p. 184° decomp. p-Nitrobenzyl ether: very pale yellow prisms from EtOH. M.p. 88°. N-p-Nitrobenzyl: very pale yellow cryst. M.p. 141°. (ii) Cryst. M.p. 143° decomp.

Diacetyl: o-methoxybenzylidene diacetate. Prisms. M.p. 75°.

m-Nitrophenylhydrazone: reddish-orange cryst. M.p. 176°.

p-Nitrophenylhydrazone: brick-red cryst. M.p. 204–5°.

Diphenylenehydrazone: needles from AcOH. M.p. 147–8°.

Anil: yellowish-red oil. B.p. 330–4°, 235–6°/30 mm. Solidifies in freezing mixture.

Scholl, Hilgers, *Ber.*, 1903, 36, 648.

Posner, *J. prakt. Chem.*, 1910, 82, 430.

Auwers, *Ann.*, 1915, 408, 239.

Fear, Menzies, *J. Chem. Soc.*, 1926, 939.

Brady, Klein, *J. Chem. Soc.*, 1927, 874.

Copisarow, *J. Chem. Soc.*, 1929, 588.

m-Methoxybenzaldehyde.

B.p. 230°, 143–5°/50 mm. D_4^{20} 1.1187, D_4^{20} 1.1244. $n_{\text{D}}^{13.5}$ 1.557, n_{D}^{20} 1.5530. Volatile in steam. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ yellow sol.

Oxime: cryst. from pet. ether. M.p. 39–40°.

Hydrazine deriv. yellow liq. B.p. 174–5°/21 mm.

p-Nitrophenylhydrazone: m.p. 171°.

Anil: oil. B.p. 223–5°/18 mm.

Phenylthiosemicarbazone: needles. M.p. 153°.

Posner, *J. prakt. Chem.*, 1910, 82, 431.

Brady, Dunn, *J. Chem. Soc.*, 1914, 105, 2412.

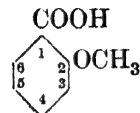
p-Methoxybenzaldehyde.

See Anisaldehyde.

4-Methoxybenzanthrone.

See under 4-Hydroxybenzanthrone.

o-Methoxybenzoic Acid (*Salicylic acid methyl ether*)



$\text{C}_8\text{H}_8\text{O}_3$

MW, 152

Plates from H_2O . M.p. 100–1° (98.5°). Very sol. EtOH, Et_2O . Sol. 200 parts H_2O at 30°. $k = 8.2 \times 10^{-5}$ at 25°. Electrolytic reduction \rightarrow o-methoxybenzyl alcohol. Strong antiseptic and antipyretic.

Me ester: $\text{C}_9\text{H}_{10}\text{O}_3$. MW, 166. B.p. 245–6°, 127–127.5°/11 mm. D_4^{20} 1.1571. $n_{\text{D}}^{19.5}$ 1.534. NH_3 .Aq. at 150° \rightarrow o-methoxybenzamide. $\text{KOH} \rightarrow$ methyl salicylate.

Et ester: $\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. B.p. 246–8°/732 mm., 135–6°/12 mm. D_4^{20} 1.1256, $D_4^{14.55}$ 1.1156. $n_{\text{D}}^{14.55}$ 1.524.

Phenyl ester: $\text{C}_{14}\text{H}_{12}\text{O}_3$. MW, 228. Prisms from EtOH. M.p. 59°. Very sol. EtOH, Et_2O .

l-Menthyl ester: cryst. from EtOH. M.p. 42°. B.p. 226°/12 mm. D_4^{20} 1.045 (super-cooled), D^{100} 0.9823. $[\alpha]_{\text{D}}^{21}$ — 51.08° (super-cooled), $[\alpha]_{\text{D}}^{100}$ — 53.37°. Triboluminescent.

p-Phenylphenacyl ester: cryst. M.p. 131°.

Chloride: $\text{C}_8\text{H}_7\text{O}_2\text{Cl}$. MW, 170.5. B.p. 254°, 128°/11 mm.

Nitrile: $\text{C}_8\text{H}_7\text{ON}$. MW, 133. M.p. 24.5°. B.p. 255–6°, 188°/98 mm., 140°/18 mm. D^{15} 1.237 (solid), D_{15}^{15} 1.095 (liq.). Volatile in steam.

Amide: $\text{C}_8\text{H}_9\text{O}_2\text{N}$. MW, 151. Plates from H_2O , prisms from Et_2O , needles from C_6H_6 . M.p. 129° (127°). Distills undecomp. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ yellow sol. N-Benzoyl: needles from EtOH. M.p. 144–5°. Sol. CHCl_3 . Mod. sol. EtOH, C_6H_6 . Spar. sol. Et_2O .

Anilide: $\text{C}_{14}\text{H}_{13}\text{O}_2\text{N}$. MW, 227. Cryst. M.p. 131°.

Graebe, *Ann.*, 1905, 340, 210.

Auwers, *Ann.*, 1915, 408, 253.

Cohen, Dudley, *J. Chem. Soc.*, 1910, 97, 1739.

McConnan, Titherley, *J. Chem. Soc.*, 1906, 89, 1332.

Miller, *Ber.*, 1889, 22, 2800.

m-Methoxybenzoic Acid.

Needles from H_2O . M.p. 110° (105°). B.p. 170–2°/10 mm. Sol. EtOH, hot H_2O , Et_2O . Electrolytic reduction \rightarrow m-methoxybenzyl alcohol.

Me ester: oil. B.p. 236–8°, 121–4°/10 mm. D_{20}^{20} 1.131. n_D^{20} 1.52236.

Et ester: b.p. 250–2°, 158–10°/43.5 mm. D_4^{20} 1.1147, $D_4^{16.4}$ 1.1032. $n_D^{16.4}$ 1.517.

l-Menthyl ester: b.p. 236–7°/30 mm. D_4^{20} 1.034, D_4^{100} 0.9766. $[\alpha]_D^{20}$ –85.39°, $[\alpha]_D^{100}$ –83.69°.

Chloride: b.p. 242–3°/733 mm.

Ullmann, Goldberg, *Ber.*, 1902, **35**, 2813.

Auwers, *Ann.*, 1915, **408**, 254.

Ullmann, Uzbachian, *Ber.*, 1903, **36**, 1805.

Cohen, Dudley, *J. Chem. Soc.*, 1910, **97**, 1740.

p-Methoxybenzoic Acid.

See Anisic Acid.

Methoxybenzoylbenzoic Acid.

See under 2'-Hydroxybenzophenone-2-carboxylic Acid and 4'-Hydroxybenzophenone-2-carboxylic Acid.

p-Methoxybenzoylcarbinol.

See under p-Hydroxyphenacyl Alcohol.

Methoxybenzoyl cyanide.

See under Hydroxybenzoylformic Acid.

Methoxybenzyl Alcohol.

See Anisyl Alcohol and under Saligenin and m-Hydroxybenzyl Alcohol.

Methoxybenzylamine.

See Anisamine and under Salicylamine and m-Hydroxybenzylamine.

p-Methoxybenzyl cyanide.

See under Homoanisic Acid.

Methoxybenzylideneacetone.

See Anisylideneacetone and under m-Hydroxybenzylideneacetone and Salicylideneacetone.

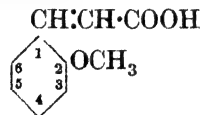
p-Methoxychalkone.

See Anisylideneacetophenone.

6-Methoxycinchoninic Acid.

See Quininic Acid.

o-Methoxycinnamic Acid (o-Coumaric acid methyl ether)



$C_{10}H_{10}O_3$

MW, 178

Trans:

Prisms from EtOH. M.p. 185–6°. Spar. sol. H_2O , MeOH, C_6H_6 , ligroin. $k = 2.1 \times 10^{-5}$ at 25°. Polymerises slowly in light. Exposure to ultraviolet light in MeOH or Py \rightarrow *cis*-form.

Me ester: $C_{11}H_{12}O_3$. MW, 192. B.p. 303.6°/745 mm., 161–3°/3 mm. $D_4^{16.9}$ 1.1366. $n_D^{16.7}$ 1.5854.

Amide: $C_{10}H_{11}O_2N$. MW, 177. Needles from EtOH. M.p. 194–5° (191–2°).

Cis:

Coumarinic acid methyl ether. Cryst. from

EtOH. M.p. 91–2° (88–9°). Very sol. EtOH. Spar. sol. AcOH. Aq., pet. ether. $k = 5.4 \times 10^{-4}$ at 25°. Conc. alkalis in sunlight \rightarrow *trans*-form.

Me ester: b.p. 247°/250 mm. D_4^{15} 1.1494, D_4^{15} 1.1406. $n_D^{10.5}$ 1.5718.

Et ester: $C_{12}H_{14}O_3$. MW, 206. B.p. 291–292.5°. $D_4^{16.7}$ 1.1016. $n_D^{16.7}$ 1.5540.

Amide: needles from CS_2 . M.p. 62.5–63.5°. Sol. EtOH, Et_2O . Spar. sol. ligroin, CS_2 . More sol. than *trans*-form.

Reychler, *Bull. soc. chim.*, 1908, **3**, 552.

Störmer, Friemel, *Ber.*, 1911, **44**, 1843 Note.

Auwers, *Ann.*, 1917, **413**, 267.

Weerman, *Rec. trav. chim.*, 1918, **37**, 5.

m-Methoxycinnamic Acid (m-Coumaric acid methyl ether).

Needles from H_2O . M.p. 117°. Very sol. EtOH, Et_2O , C_6H_6 . Mod. sol. H_2O .

Me ester: oil. B.p. 305–7°/748 mm.

Posner, *J. prakt. Chem.*, 1910, **82**, 430.

p-Methoxycinnamic Acid (p-Coumaric acid methyl ether).

Exists in two forms.

(i) Occurs in roots of *Veronica virginica*, Linn. Needles from EtOH. M.p. 170°. Sol. AcOH. Mod. sol. H_2O , EtOH. Spar. sol. C_6H_6 . $k = 2.1 \times 10^{-5}$ at 25°. Ultraviolet light on MeOH or AcOH sols or on alk. sol. \rightarrow (ii). Not polymerised by sunlight.

Me ester: $C_{11}H_{12}O_3$. MW, 192. Plates from EtOH. M.p. 90°. B.p. 314–15°/755 mm. Sol. hot EtOH.

Et ester: $C_{12}H_{14}O_3$. MW, 206. Plates from EtOH. M.p. 49–50°. B.p. 315°, 245°/120 mm., 177–80°/12 mm. D_4^{78} 1.0508. $n_D^{59.2}$ 1.562.

Amide: $C_{10}H_{11}O_2N$. MW, 177. Cryst. from EtOH. M.p. 186°. Spar. sol. H_2O .

Chloride: $C_{10}H_9O_2Cl$. MW, 196.5. Cryst. M.p. 50°.

Nitrile: $C_{10}H_9ON$. MW, 159. Cryst. from EtOH. M.p. 64°. B.p. 218–20°/90 mm., 165–72°/18 mm. Very sol. EtOH.

(ii) Cryst. from C_6H_6 -pet. ether or H_2O . M.p. 66°. $k = 9.3 \times 10^{-5}$ at 25°. Not polymerised by sunlight. Readily forms liquid crystals.

Amide: cryst. from MeOH. M.p. 129°. Sunlight \rightarrow (i).

Knoevenagel, *Ber.*, 1898, **31**, 2606.

Auwers, *Ann.*, 1917, **413**, 268.

Stoermer, *Ber.*, 1911, **44**, 657.

Goldschmidt, Frankel, *Monatsh.*, 1914, **35**, 385.

2-Methoxy-3-cinnamylidene-crotonic Acid

2-Methoxy-3-cinnamylidene-crotonic Acid.

See Kawaic Acid.

Methoxycoumarin.

See Herniarin and under 3-, and 4-Hydroxycoumarin.

6-Methoxy-7:8-diethoxycoumarin.

See under Fraxetin.

4-Methoxy-2-[3:4-dimethoxyphenyl-ethyl]-quinoline.

See Galipine.

4-Methoxydiphenyl Ether 2-carboxylic Acid.

See under Gentisic Acid.

Methoxydithioformic Acid.

See Methylxanthogenic Acid.

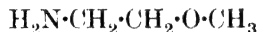
3-Methoxy-4-ethoxyallylbenzene.

See under Eugenol.

3-Methoxy-4-ethoxy-1-propenylbenzene.

See under Isosafroegenol.

2-Methoxyethylamine (Methyl 2-aminoethyl ether, ethanamine methyl ether)



$\text{C}_3\text{H}_9\text{ON}$

MW, 75

B.p. $95^\circ/756$ mm. Misc. with H_2O , EtOH. Strong base.

B.HCl: hygroscopic cryst.

Picrolonate: needles. M.p. 235° .

N-Di-Me: methyl dimethylaminoethyl ether.

$\text{C}_5\text{H}_{13}\text{ON}$. MW, 103. B.p. $101^\circ/757$ mm. D_4^{15} 0.8139, D_4^{20} 0.80988. n_D^{20} 1.95483. Strong base.

Clarke, *J. Chem. Soc.*, 1912, **101**, 1808.

Traube, Peiser, *Ber.*, 1920, **53**, 1507.

Methoxy-ethylbenzene.

See under Ethylphenol.

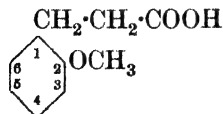
5-Methoxy-2-ethyltetrahydrofuran.

See under 3-Hydroxy-*n*-caproic Aldehyde.

Methoxyformamidine.

See *O*-Methylisourea.

***o*-Methoxyhydrocinnamic Acid (Mehlotic acid methyl ether, *o*-hydrocoumaric acid methyl ether)**



$\text{C}_{10}\text{H}_{12}\text{O}_3$

MW, 180

Cryst. from pet. ether. M.p. 92° ($87-9^\circ$).

Me ester: $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. B.p. $274-5^\circ/754$ mm. $142.5-143^\circ/12$ mm. $D_4^{18.4}$ 1.0954. $n_D^{18.4}$ 1.513.

Hydrazide: needles from 25% EtOH. M.p. $83-4^\circ$. Sol. EtOH. Spar. sol. Et_2O . Insol.

3-Methoxy-4:5-methylenedioxybenzaldehyde

H_2O . *B.HCl*: needles from EtOH- Et_2O . M.p. $166-7^\circ$. Sol. H_2O , EtOH, Me_2CO , AcOH.

Amide: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Needles from EtOH. M.p. 111° .

Pschorr, Einbeck, *Ber.*, 1905, **38**, 2074.

Auwers, *Ann.*, 1918, **415**, 159.

Slotta, Heller, *Ber.*, 1930, **63**, 3036.

***m*-Methoxyhydrocinnamic Acid (*m*-Hydrocoumaric acid methyl ether).**

Needles. M.p. 51° (45°). Very sol. org. solvents.

Chloride: $\text{C}_{10}\text{H}_{11}\text{O}_2\text{Cl}$. MW, 198.5. Yellow oil. B.p. $165^\circ/22$ mm. Darkens on exposure to air and light.

Tiemann, Ludwig, *Ber.*, 1882, **15**, 2052.

Ingold, Piggott, *J. Chem. Soc.*, 1923, **123**, 1502.

***p*-Methoxyhydrocinnamic Acid (Phloretic acid methyl ether, *p*-hydrocoumaric acid methyl ether).**

Cryst. from EtOH or boiling H_2O . M.p. $104-5^\circ$. B.p. $192-4^\circ/15$ mm. Sol. EtOH, Et_2O . Sol. 900 parts H_2O at 25° .

Me ester: $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. Plates from boiling H_2O . M.p. 38° . B.p. 278° ($265-70^\circ$).

Et ester: $\text{C}_{12}\text{H}_{16}\text{O}_3$. MW, 208. B.p. $152-3^\circ/12$ mm.

Chloride: $\text{C}_{10}\text{H}_{11}\text{O}_2\text{Cl}$. MW, 198.5. B.p. $161-5^\circ/15$ mm.

Amide: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Prisms from EtOH. M.p. $125-6^\circ$ (124°).

Nitrile: $\text{C}_{10}\text{H}_{11}\text{ON}$. MW, 161. Oil. B.p. $290-300^\circ$, $167^\circ/15$ mm., $158^\circ/11$ mm.

Bougeault, *Compt. rend.*, 1900, **131**, 44.

Barger, Walpole, *J. Chem. Soc.*, 1909, **95**, 1723.

Goldschmiedt, v. Fraenkel, *Monatsh.*, 1914, **35**, 386.

Ramart-Lucas, Amagat, *Bull. soc. chim.*, 1932, **51**, 108.

2-Methoxy-6-methylanisaldehyde.

See under 5-Hydroxy-3-methoxy-*o*-toluic Aldehyde.

3-Methoxy-*N*-methylantranilic Acid.

See Damasceninic Acid.

4-Methoxy-*N*-methyl-3-cyano- α -pyridone.

See Ricinine.

3-Methoxy-4:5-methylenedioxy-1-allylbenzene.

See Myristicin.

3-Methoxy-4:5-methylenedioxybenzaldehyde.

See Myristicinaldehyde.

3-Methoxy-4 : 5-methylenedioxy-benzoic Acid

3-Methoxy-4 : 5-methylenedioxybenzoic Acid.

See Myristicic Acid.

8-Methoxy-6 : 7-methylenedioxy-N-methyltetrahydroisoquinoline.

See Hydrocotarnine.

Methoxy-methylenedioxyphthalic Acid.

See Cotarnic Acid and Isocotarnic Acid.

3-Methoxy-5-methylsalicylaldehyde.

See 4-Hydroxy-5-methoxy-*m*-toluic Aldehyde.

Methoxymethyl salicylate.

See Mesotan.

6-Methoxy-2-methyltetrahydropyran.

See under 4-Hydroxy-*n*-caproic Aldehyde.

Methoxyphenol.

See Guaiacol and under Hydroquinone and Resorcinol.

5-Methoxy-2-phenoxybenzoic Acid.

See under Gentisic Acid.

Methoxyphenylacetaldehyde.

See Homoanisaldehyde and under Hydroxyphenylacetaldehyde.

p-Methoxyphenyl acetate.

See under Hydroquinone.

Methoxyphenylacetic Acid.

See Homoanisic Acid and under Mandelic Acid and Hydroxyphenylacetic Acid.

2-Methoxy-6-phenylhexatriene-1-carboxylic Acid.

See Kawaic Acid.

8-Methoxy-2-phenylquinoline-4-carboxylic Acid.

See Isatophan.

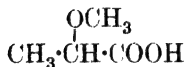
Methoxyphenyl styryl Ketone.

See under 2', 3', and 4'-Hydroxychalkone.

p-Methoxyphenylpropylene Glycol.

See Anethole Glycol.

1-Methoxypropionic Acid (*Lactic acid methyl ether*)



$\text{C}_4\text{H}_8\text{O}_3$

MW, 104

d-.
Oil.

B.p. 108–10°/30 mm. D_4^{20} 1.0908. $[\alpha]_D^{20}$ – 75.47°.

Me ester: $\text{C}_5\text{H}_{10}\text{O}_3$. MW, 118. B.p. 45°/22 mm. D_4^{20} 0.9967. $[\alpha]_D^{10}$ – 97.66°, $[\alpha]_D^{20}$ – 95.53°.

Et ester: $\text{C}_6\text{H}_{12}\text{O}_3$. MW, 132. B.p. 46°/12 mm. D_4^{20} 0.9551. $[\alpha]_D^{20}$ – 90.08°.

Propyl ester: $\text{C}_7\text{H}_{14}\text{O}_3$. MW, 146. B.p. 70–1°/25 mm. $[\alpha]_D^{20}$ + 85.4°.

Chloride: $\text{C}_4\text{H}_7\text{O}_2\text{Cl}$. MW, 122.5. B.p. 38–9°/41 mm. $[\alpha]_D^{20}$ + 91.8°.

Amide: $\text{C}_4\text{H}_9\text{O}_2\text{N}$. MW, 103. Cryst. M.p.

81°. $[\alpha]_D^{20}$ + 38.2° (liq.). *N-Di-Me*: $\text{C}_6\text{H}_{13}\text{O}_2\text{N}$. MW, 131. B.p. 90–1°/18–9 mm. $[\alpha]_D^{15}$ + 63.9°.

Acetoveratrone deriv.: yellow needles. M.p. 91°. $[\alpha]_D^{17}$ + 38.32° in acetylene tetrachloride.

l-.
Not isolated in free state.

Me ester: b.p. 130–1°/760 mm., 40°/18 mm. $D^{18.4}$ 0.9986. $[\alpha]_D^{18.4}$ + 97.16°.

Nitrile: $\text{C}_4\text{H}_7\text{ON}$. MW, 85. B.p. 115°.

Acetoveratrone deriv.: light yellow needles from Et_2O . M.p. 91°. $[\alpha]_D^{18}$ – 38.8° in acetylene tetrachloride.

dl-.
Syrup. Volatile in steam.

Me ester: b.p. 135–8°, 129.5°/752 mm. D_4^{15} 1.0108, D_4^{20} 1.0024. n_D^{20} 1.39685.

Et ester: b.p. 135.5°/760 mm. D^0 0.9906, D^{18} 0.9765.

Amide: cryst. M.p. 81°. *N-Di-Me*: b.p. 90–1°/18–19 m.

Nitrile: b.p. 118°/729 mm. D_4^{20} 0.893. n_D^{20} 1.382.

Acetoveratrone deriv.: prisms from Et_2O . M.p. 74°.

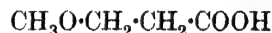
Purdie, Irvine, *J. Chem. Soc.*, 1899, 75, 486.

Gauthier, *Ann. chim. phys.*, 1909, 16, 315.

Freudenberg, Wolf, *Ber.*, 1926, 59, 839.

Freudenberg, Markert, *Ber.*, 1927, 60, 2452.

2-Methoxypropionic Acid (*Hydracrylic acid methyl ether*)



$\text{C}_4\text{H}_8\text{O}_3$

MW, 104

B.p. 107°/10 mm. D_4^{15} 1.1064, D_4^{20} 1.1020. $k = 3.46 \times 10^{-4}$ at 25°.

Me ester: $\text{C}_5\text{H}_{10}\text{O}_3$. MW, 118. B.p. 142.6–142.8°/760 mm. D_{15}^{15} 1.0148, D_4^{20} 1.0086. n_D^{20} 1.40301.

Amide: $\text{C}_4\text{H}_9\text{O}_2\text{N}$. MW, 103. Cryst. M.p. 50.5°.

l-Menthyl ester: b.p. 135–7°/10 mm. $[\alpha]_D^{20}$ – 77.01°.

Chloride: $\text{C}_4\text{H}_7\text{O}_2\text{Cl}$. MW, 122.5. B.p. 135–6°/758 mm.

Nitrile: $\text{C}_4\text{H}_7\text{ON}$. MW, 85. B.p. 165.5°/763 mm. D_4^{15} 0.9463, D_4^{20} 0.9367.

Palomaa, *Chem. Zentr.*, 1912, II, 596.

Kilpi, *Z. physik. Chem.*, 1912, 80, 184; 1914, 86, 672.

Jones, Powers, *J. Am. Chem. Soc.*, 1924, 46, 2533.

2-Methoxypropylene.

See under Isopropenyl Alcohol.

Methoxypropylene oxide.

See under Glycide.

1-[4-Methoxy-2-quinolyl]-2-[3:4-dimethoxyphenyl]-ethane.

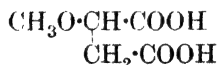
See Galipine.

Methoxysalicylaldehyde.

See under Gentisic Aldehyde, 2:3-Dihydroxybenzaldehyde, and Resorecylic Aldehyde.

Methoxysalicylic Acid.

See under Gentisic Acid, 2:3-Dihydroxybenzoic Acid, and Resorecylic Acid.

Methoxysuccinic Acid (Malic acid methyl ether)

$\text{C}_5\text{H}_8\text{O}_5$

MW, 148

d.-

Prisms. M.p. 88–90°. $[\alpha]_D^{18} + 33.3^\circ$ in H_2O , $[\alpha]_D^{11} + 58.29^\circ$ in Me_2CO .

Mono- NH_4 salt: $[\alpha]_D^{14} + 25.86^\circ$ in H_2O .

Di- NH_4 salt: $[\alpha]_D^{14} + 12.32^\circ$ in H_2O .

Mono- K salt: cryst. $[\alpha]_D^{18.5} + 23.46^\circ$ in H_2O .

Di- K salt: $[\alpha]_D^{16.5} + 9.54^\circ$ in H_2O .

Di-Me ester: $\text{C}_7\text{H}_{12}\text{O}_5$. MW, 176. B.p. 119°/22 mm. D_4^{25} 1.1498. $[\alpha]_D^{13} + 52.51^\circ$.

Cinchonine salt: cryst. M.p. 171–3°. $[\alpha]_D^{17} + 154.9^\circ$ in H_2O .

l.-

Cryst. M.p. 89°. $[\alpha]_D^{11} - 32.94^\circ$ in H_2O , $[\alpha]_D^{13} - 58.18^\circ$ in Me_2CO , $[\alpha]_D^{13} - 62.93^\circ$ in AcOEt .

Mono- NH_4 salt: cryst. $[\alpha]_D - 25.85^\circ$ in H_2O .

Mono- K salt: cryst. $[\alpha]_D^{18} - 23.59^\circ$ in H_2O .

Ca salt: $[\alpha]_D^{14.5} + 4.30^\circ$ in H_2O .

Strychnine salt: leaflets. $[\alpha]_D^{19} - 29.7^\circ$ in H_2O .

Mono-Et ester: $\text{C}_6\text{H}_{10}\text{O}_5$. MW, 162. Needles from Et_2O -ligroin. M.p. 46–8°. B.p. about 145°/10 mm. Sol. org. solvents. $[\alpha]_D^{20} - 41.85^\circ$ in H_2O , $[\alpha]_D^{20} - 60.9^\circ$ in Me_2CO . K salt: $[\alpha]_D^{16} - 19.05^\circ$ in H_2O .

Di-Me ester: oil. B.p. 113–14°/15 mm. D_4^{20} 1.1415, D_D^{60} 1.0983. $[\alpha]_D^{15} - 54.2^\circ$.

Di-Et ester: $\text{C}_9\text{H}_{16}\text{O}_5$. MW, 204. B.p. 126°/17 mm. D_4^{20} 1.0676, D_4^{40} 1.0476. $[\alpha]_D^{18} - 50.11^\circ$.

Dipropyl ester: $\text{C}_{11}\text{H}_{20}\text{O}_5$. MW, 232. B.p. 173–173.5°/58 mm., 145–6°/12 mm. D_4^{20} 1.0312, D_D^{60} 0.9908. $[\alpha]_D^{15} - 45.12^\circ$.

Di-*n*-butyl ester: $\text{C}_{13}\text{H}_{24}\text{O}_5$. MW, 260. B.p. 172°/25 mm. D_4^{15} 1.0149. $[\alpha]_D^{15} - 41.63^\circ$.

Dichloride: $\text{C}_5\text{H}_6\text{O}_3\text{Cl}_2$. MW, 185. B.p. 114–17°/56 mm. D_4^{22} 1.341. $[\alpha]_D^{20} - 54.18^\circ$ in C_6H_6 .

Diamide: see under Malamide.

Dianilide: see under Malanilide.

dl.-

Cryst. from Et_2O . M.p. 108°. Sol. H_2O , EtOH , Et_2O . $\text{HI} \rightarrow$ succinic acid.

Di-Me ester: cryst. from CS_2 . M.p. 28°. B.p. 218–20°.

Diamide: see under Malamide.

Purdie, Williamson, *J. Chem. Soc.*, 1895, 67, 959.

6-Methoxytetrahydroquinoline.

See Thalline.

p-Methoxythioanisole.

See under Thiohydroquinone.

p-Methoxythiophenetole.

See under Thiohydroquinone.

Methoxythiophenol.

See under Thiocatechol, Thiohydroquinone, and Thioresorcinol.

 ω -Methoxytoluene.

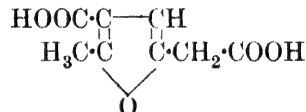
See Methyl benzyl Ether.

p-Methoxy- α -toluic Acid.

See Homoanisic Acid.

p-Methoxy- α -toluic Aldehyde.

See Homoanisaldehyde.

Methronic Acid (5-Methyl-4-carboxy- α -furyl-acetic acid)

$\text{C}_8\text{H}_8\text{O}_5$

MW, 184

Needles from H_2O . M.p. 204°. Sol. EtOH , C_6H_6 . Spar. sol. Et_2O , AcOH . Less sol. cold H_2O . Insol. CHCl_3 , CS_2 . Sol. alkalis, cold conc. H_2SO_4 . Long heating at m.p. \rightarrow pyrotritaric acid + CO_2 . Sublimes. Conc. $\text{HNO}_3 \rightarrow$ oxalic and acetic acids. $\text{NH}_3\cdot\text{Aq.}$ at 320° \rightarrow 2:5-dimethylpyrrole.

Mono-Me ester: $\text{C}_9\text{H}_{10}\text{O}_5$. MW, 198. Needles from EtOH . M.p. 98°. Sol. Na_2CO_3 .

Di-Me ester: $\text{C}_{10}\text{H}_{12}\text{O}_5$. MW, 212. Oil. In sol. Na_2CO_3 .

Mono-Et ester: $\text{C}_{10}\text{H}_{12}\text{O}_5$. MW, 212. Needles from H_2O . M.p. 76°. Sol. EtOH , Et_2O , C_6H_6 , CHCl_3 . Mod. sol. CS_2 . Spar. sol. hot H_2O . Phenylhydrazine deriv.: needles from EtOH . M.p. 133–4°. Sol. hot EtOH . Spar. sol. Et_2O . Insol. cold NaOH .

Di-Et ester: $\text{C}_{12}\text{H}_{16}\text{O}_5$. MW, 240. Oil. B.p. 300–5°.

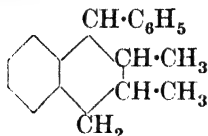
Phenylhydrazine deriv.: needles from EtOH . M.p. 211–12° decomp. Sol. EtOH . Spar. sol. Et_2O . Insol. H_2O . Sol. cold Na_2CO_3 .

Polonowsky, *Ann.*, 1888, 246, 5.

Fittig, v. Eynern, *Ann.*, 1889, 250, 178.

Treflew, *Chem. Abstracts*, 1929, 23, 3926.

Methronol (2:3-Dimethyl-1-phenyl-1:2:3:4-tetrahydronaphthalene)



$C_{18}H_{20}$

MW, 236

B.p. 322–3°. Volatile in steam.

Erdmann, *Ann.*, 1885, **227**, 249.

N-Methylacetamide (*Acetylmethylamine*)



C_3H_7ON

MW, 73

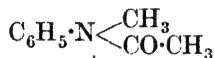
Needles. M.p. 28°. B.p. 204–6°. Sol. H_2O , EtOH, Et_2O , $CHCl_3$, C_6H_6 . Insol. ligroin. Forms unstable hydrochloride.

B, HNO_3 : m.p. 58°.

Naegeli, Grüntuch, Lendorff, *Helv. Chim. Acta*, 1929, **12**, 255.

Hofmann, *Ber.*, 1881, **14**, 2729.

N-Methylacetanilide (*Acetylmethylaniline*, *Exalgin*)



$C_9H_{11}ON$

MW, 149

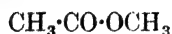
Leaflets from ligroin, needles from Et_2O . M.p. 101–2° (104°). B.p. 253° (245°). D_4^{25} 1.0036, D_4^{45} 0.9703. Hot $HNO_3 \rightarrow$ 2:4-dinitromethylaniline. $ZnCl_2 \rightarrow$ quinoline + *p*-toluidine. Antipyretic.

Hepp, *Ber.*, 1877, **10**, 329.

Pictot, Crépiaux, *Ber.*, 1888, **21**, 1108.

Kaufmann, *Ber.*, 1909, **42**, 3482.

Methyl acetate

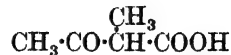


$C_3H_6O_2$

MW, 74

M.p. – 98.7°. B.p. 57.5°. D_0^0 0.9643, D_{25}^{25} 0.9282, D_4^0 0.9577, D_4^{20} 0.9280, D_4^{25} 0.8825. n_D^{20} 1.35915, n_D^{20} 1.3654, n_D^{20} 1.3689, n_D^{20} 1.3593. Vap. press. 104.8 mm. at 10°, 169.8 mm. at 20°, 265.8 mm. at 30°, 400.4 mm. at 40°, 588.0 mm. at 50°, 837.5 mm. at 60°. Crit. temp. 233°. Crit. press. 46 atm. Crit. density 0.3252. Mol. b.p. elevation 20.6. Heat of comb. C_p 399.24 Cal. Sol. to 24% in H_2O at 20°. Dissolves many metallic salts. Irradiation by ultraviolet light $\rightarrow CO_2$, H_2 and CO. ThO_2 at high temp. $\rightarrow CH_3 \cdot CO \cdot CH_3$, $CH_3 \cdot O \cdot CH_3$ and CO_2 .

1-Methylacetoacetic Acid (1-Acetopropionic acid)



$C_5H_8O_3$

MW, 116

Oil. B.p. 224°/34 mm. Sol. H_2O . Heat aq. sol. \rightarrow methyl ethyl ketone.

Me ester: $C_6H_{10}O_3$. MW, 130. B.p. 177.4°, 80°/20 mm. D_4^0 1.020, D_{25}^{25} 1.0247. n_D^{25} 1.416.

Et ester: $C_7H_{12}O_3$. MW, 144. B.p. 180.8°/743.2 mm., 75.5–76.5°/12 mm. D_4^{18} 1.008. $n_D^{17.8}$ 1.420. $FeCl_3 \rightarrow$ blue col. *Semicarbazone*: blue cryst. M.p. 183–7° decomp. *Thiosemicarbazone*: cryst. M.p. 192°.

Amide: $C_5H_9O_2N$. MW, 115. Needles from Et_2O . M.p. 73°.

Nitrile: C_5H_7ON . MW, 97. B.p. 145–6°, 78°/19 mm. D_4^{20} 0.9769. Misc. with EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. H_2O . $FeCl_3 \rightarrow$ dark green col. *Semicarbazone*: needles from EtOH.Aq. M.p. 153°. Insol. Et_2O .

Anilide: $C_{11}H_{13}O_2N$. MW, 191. Prisms from H_2O . M.p. 138–40°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. hot H_2O .

v. Reymenant, *Chem. Zentr.*, 1901, I, 95.

Meyer, *Ber.*, 1912, **45**, 2850.

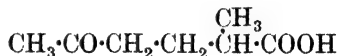
Riedel, D.R.P., 266,405, (*Chem. Zentr.*, 1913, II, 1716).

Mohr, *J. prakt. Chem.*, 1914, **90**, 198.

1-Methyl-1-acetobutyric Acid.

See 1-Methyl-1-ethylacetoacetic Acid.

1-Methyl-3-acetobutyric Acid



$C_7H_{12}O_3$

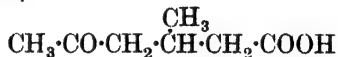
MW, 144

B.p. 157–9°/13 mm.

Et ester: $C_9H_{16}O_3$. MW, 172. B.p. 110–12°/13 mm.

Ruzicka, *Helv. Chim. Acta*, 1919, **2**, 153.

2-Methyl-3-acetobutyric Acid (3-Acetoisovaleric acid)



$C_7H_{12}O_3$

MW, 144

Oil. B.p. 140–2°/12 mm. Sol. H_2O . $D^{18.7}$ 1.0614. $n_D^{18.2}$ 1.4461. $k = 2.7 \times 10^{-5}$ at 25°.

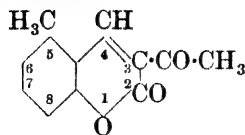
Et ester: $C_9H_{16}O_3$. MW, 172. B.p. 110–11°/13 mm.

Nitrile: $C_7H_{11}ON$. MW, 125. B.p. 105°/11 mm.

Semicarbazone: prisms from H_2O . M.p. 170–4°.

Auwers, Peters, *Ber.*, 1910, **43**, 3091.

Wohl, Maag, *Ber.*, 1910, **43**, 3285.

5-Methyl-3-acetocoumarin $C_{12}H_{10}O_3$

MW, 202

Yellow needles from EtOH. M.p. 115°. Sol. hot EtOH.

Oxime: needles. M.p. 214° decomp. Spar. sol. boiling EtOH.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 87.

6-Methyl-3-acetocoumarin.

Yellow plates from EtOH. M.p. 128–128.4°. Spar. sol. cold EtOH.

Oxime: yellow cryst. from $PhNO_2$. M.p. 219° decomp. Insol. EtOH, Et_2O , C_6H_6 , pet. ether.

Semicarbazone: cryst. from $PhNO_2$. M.p. 211° (charring). Insol. EtOH, AcOEt.

Phenylhydrazone: yellow needles from EtOH. M.p. 193–4°. Spar. sol. Et_2O . Almost insol. cold EtOH.

See previous reference.

7-Methyl-3-acetocoumarin.

Needles from EtOH. M.p. 156–7°. Spar. sol. hot EtOH.

Oxime: yellow needles from EtOH. M.p. 224° decomp. Spar. sol. hot EtOH.

See previous reference.

8-Methyl-3-acetocoumarin.

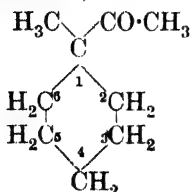
Yellow needles from EtOH. M.p. 125.8–126.2°. Sol. hot EtOH, C_6H_6 . Spar. sol. pet. ether. Insol. H_2O .

Oxime: needles from boiling EtOH. M.p. 212–13°.

Phenylhydrazone: yellow needles from $PhNO_2$ -EtOH. M.p. 168–9°. Spar. sol. hot EtOH.

Semicarbazone: yellow cryst. from $PhNO_2$. M.p. 224–5° decomp. Spar. sol. EtOH.

See previous reference.

1-Methyl-1-acetocyclohexane (1-Methyl-hexahydroacetophenone) $C_9H_{16}O$

MW, 140

B.p. 83°/18 mm.

Oxime: exists in two forms. (α) Cryst. from EtOH. M.p. 83°. (β) M.p. 45°.

Semicarbazone: exists in two forms. (α) Needles from pet. ether. M.p. 158°. (β) Cryst. from pet. ether. M.p. 176°.

Tarbouriech, *Compt. rend.*, 1909, **149**, 863.

2-Methyl-1-acetocyclohexane (2-Methyl-hexahydroacetophenone, methyl hexahydro-o-tolyl ketone).

B.p. 197–200°, 77–80°/18 mm. Combines readily with $NaHSO_3$.

Semicarbazone: cryst. M.p. 172–3°.

Darzens, *Compt. rend.*, 1907, **144**, 1124.

3-Methyl-1-acetocyclohexane (3-Methyl-hexahydroacetophenone, methyl hexahydro-m-tolyl ketone).

Active form:

B.p. 199–202°. D^{19}_D 0.912. n^{19}_D 1.4517.

Semicarbazone: m.p. 180–1°.

dl.

B.p. 99–100°/38 mm. Does not combine with $NaHSO_3$.

Semicarbazone: m.p. 174–5°.

See previous reference and also

Haworth, Perkin, Wallach, *Ann.*, 1913, **399**, 170.

4-Methyl-1-acetocyclohexane (4-Methyl-hexahydroacetophenone, methyl hexahydro-p-tolyl ketone).

B.p. 195–7°, 75–6°/14 mm. D^{18}_D 0.9055. n^{18}_D 1.4509. Combines readily with $NaHSO_3$.

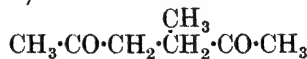
Oxime: cryst. from MeOH.Aq. M.p. 57–9°. B.p. 125–30°/15 mm.

Semicarbazone: exists in two forms. (i) Cryst. from MeOH. M.p. 159°. (ii) M.p. 175°.

Wallach, *Ann.*, 1912, **381**, 89.

Methyl-acetoheptene.

See under Homomesitones.

3-Methylacetonylacetone (3-Methylhexan-2-one-2:5, 1:2-diacetopropene, 2:5-diketo-3-methylhexane) $C_7H_{12}O_2$

MW, 128

Sweet smelling liq. B.p. 195–6°/740 mm., 71°/10 mm. D^{20}_D 0.9527. n^{20}_D 1.4260. Sol. most org. solvents. Misc. with H_2O in all proportions.

Di-semicarbazone: cryst. from H_2O . M.p. 219–20°.

p-Nitrophenylhydrazone: cryst. from toluene. M.p. 112–13°.

Youtz, Perkins, *J. Am. Chem. Soc.*, 1929, **51**, 3514.

Methylacetonylcarbinol.

See Acetoisopropyl Alcohol.

Methyl acetonyl Diketone.

See Hexantrione-2 : 3 : 5.

Methyl acetonyl Ether.

See Methoxyacetone.

N-Methyl-2-acetonylpyrrolidine.

See Hygrine.

Methyl-acetopentene.

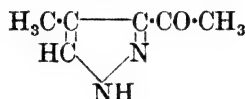
See under Homomesitones.

Methylacetophenone.

See Methyl tolyl Ketone.

Methyl-3-acetopropylcarbinol.

See 2-Heptanolone-6.

4-Methyl-3-acetopyrazole $\text{C}_6\text{H}_8\text{ON}_2$

MW, 124

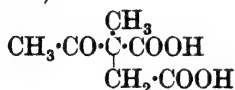
M.p. 102–3°. B.p. 160–1°/26 mm. Sol. H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 . Ox. \rightarrow 4-methylpyrazole-3-carboxylic acid.

Phenylhydrazone: needles from EtOH.Aq. M.p. 136°.

Klages, Rönneburg, *Ber.*, 1903, 36, 1131.

6-Methyl-3-acetopyronone-2.

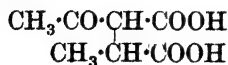
See Dehydracetic Acid.

1-Methyl-1-acetosuccinic Acid (1-Aceto-pyrotartaric acid) $\text{C}_7\text{H}_{10}\text{O}_5$

MW, 174

Di-Et ester: $\text{C}_{11}\text{H}_{18}\text{O}_5$. MW, 230. B.p. 263°, 154°/20 mm. $\text{Ba}(\text{OH})_2$ or $\text{HCl} \rightarrow$ 2-acetobutyric acid.

Blaise, *Bull. soc. chim.*, 1900, 23, 920.

2-Methyl-1-acetosuccinic Acid (2-Aceto-pyrotartaric acid) $\text{C}_7\text{H}_{10}\text{O}_5$

MW, 174

Free acid not isolated.

Mono-Et ester: $\text{C}_9\text{H}_{14}\text{O}_5$. MW, 202. Prisms. M.p. 66–7°. Sol. most org. solvents. Insol. pet. ether.

Di-Et ester: $\text{C}_{11}\text{H}_{18}\text{O}_5$. MW, 230. B.p. 152°/26 mm., 145–7°/14 mm. $D_4^{17.5}$ 1.0620.

Lactone: cryst. from EtOH. M.p. 176°.

Bischoff, *Ann.*, 1881, 206, 320.

Willstätter, Clarke, *Ber.*, 1914, 47, 294.

N-Methyl-acet-phenetidine.

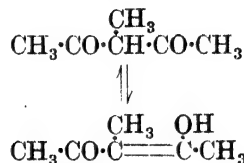
See under N-Methylphenetidine.

N-Methyl-acet-toluidide.

See under N-Methyltoluidine.

N-Methyl-acet-xylidide.

See under N-Methylxylidine.

Methylacetylacetone (3-Methylpentandione-2 : 4, 2 : 4-diketo-3-methylpentane 1 : 1-diacetyl-ethane) $\text{C}_6\text{H}_{10}\text{O}_2$

MW, 114

B.p. 60–5°/13 mm. D_4^{20} 0.976. n_D^{20} 1.4437. The equilibrium mixture contains 47% enol. Forms salts readily with Si, Zn, Ni, Co, Mn, Cr, Ti, Ce, Th, Fe, Al, Pt. Hydroxylamine \rightarrow trimethylisoxazole.

Auwers, Jacobsen, *Ann.*, 1922, 426, 227.

Kaufman, Liepe, *Ber.*, 1925, 58, 1560.

B.D.C., E.P. 289,493, (*Chem. Abstracts*, 1929, 23, 606).

Methylacetylcarbinol.

See Acetoïn.

Methylacetylene.

See Allylene.

Methylacetylthiophene.

See Acetomethylthienone.

sym.-Methylacetylurea $\text{C}_4\text{H}_8\text{O}_2\text{N}_2$

MW, 116

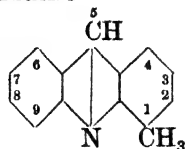
Prisms from H_2O . M.p. 180–1°. Sol. hot H_2O , less sol. cold. Spar. sol. EtOH, Et_2O . Heated to 200° \rightarrow methyl isocyanate; heated further \rightarrow $\text{CO}_2 + \text{NH}_3$. H_2O at 150° \rightarrow $\text{CH}_3\cdot\text{NH}_2 + \text{CH}_3\cdot\text{COOH} + \text{CO}_2 + \text{NH}_3$. Hot conc. $\text{HCl} \rightarrow$ $\text{CH}_3\cdot\text{COOH} +$ methylurea. Hot conc. $\text{H}_2\text{SO}_4 \rightarrow$ methane-disulphonic acid. Conc. HNO_3 at room temp. \rightarrow $\text{CO}_2 + \text{N}_2\text{O}$. Oxalyl chloride \rightarrow 1-methyl-3-acetylparabanic acid.

Behrend, Odenwald, *Ann.*, 1918, 416, 228.

Young, Clark, *J. Chem. Soc.*, 1898, 73, 364.

Hofmann, *Ber.*, 1881, 14, 2727.

1-Methylacridine



$C_{14}H_{11}N$ MW, 193

Needles from EtOH. M.p. 88°. Sol. EtOH. Spar. sol. cold H_2O .

Locher, *Ann.*, 1894, 279, 279.

2-Methylacridine.

Needles from EtOH. M.p. 125-6°.

Borsche, *Ann.*, 1910, 377, 118.

3-Methylacridine.

Yellow needles from EtOH.Aq. M.p. 134°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin. Sol. conc. H_2SO_4 to bluish-green fluorescent sol.

Ullmann, *J. prakt. Chem.*, 1887, 36, 265.

5-Methylacridine (ms-Methylacridine).

Plates from ligroin. M.p. 117-18°. Spar. volatile in steam. Ox. \rightarrow quinoline-tricarboxylic acid.

Methochloride: needles from H_2O . M.p. 200°.

Methiodide: red needles from H_2O . M.p. 235-45° (185°). Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O .

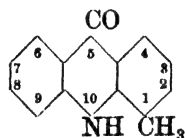
Tartrate: needles from H_2O . M.p. 153-4°.

Picrate: needles from EtOH. M.p. 213-14°.

Königs, *Ber.*, 1899, 32, 3607.

Kaufmann, Albertini, *Ber.*, 1911, 44, 2054.

1-Methylacridone



$C_{14}H_{11}ON$ MW, 209

Needles from EtOH. M.p. 345-6°. Sol. hot EtOH. Sublimes.

Pictet, Hubert, *Ber.*, 1896, 29, 1191.

3-Methylacridone.

Cryst. from EtOH. M.p. 338°. Sol. alc. KOH.

See above reference.

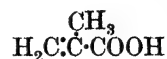
10-Methylacridone (N-Methylacridone).

Yellow needles from EtOH. M.p. 203.5°. Sublimes. Alc. sol. fluoresces blue.

Graebe, Lagodzinski, *Ann.*, 1893, 276, 47.

Pictet, Steinmann, *Ber.*, 1902, 35, 2536.

1-Methylacrylic Acid (Methacrylic acid, propylene-2-carboxylic acid)



$C_4H_6O_2$

MW, 86

Prisms. M.p. 15-16°. B.p. 160.5°, 72°/14 mm., 60°/12 mm. D_4^{20} 1.0153. n_D^{20} 1.4314. Sol. H_2O , EtOH, Et_2O . Polymerises on repeated dist., or more rapidly by heating under pressure with HCl. NaHg \rightarrow isobutyric acid. HI \rightarrow 2-iodoisobutyric acid. Br in CS_2 \rightarrow 1:2-dibromoisobutyric acid. HOCl \rightarrow 2-chloro-1-hydroxyisobutyric acid. KOH fusion \rightarrow propionic acid. Used in highly polymerised form as synthetic resin.

Polymer: $(C_4H_6O_2)_8$. MW, 688. Porcelain-like mass. Darkens at 150°, commences to decompose at 200°, liquefies at 300°. Spar. sol. EtOH. Insol. Et_2O , $CHCl_3$, AcOH, C_6H_6 . Sol. NH_3 . Stable to HNO_3 , H_2SO_4 , H_2CrO_4 , and KOH fusion.

Me ester: see Methyl 1-methylacrylate.

Et ester: $C_6H_{10}O_2$. MW, 114. B.p. 118°, 30°/18 mm.

Amide: C_4H_7ON . MW, 85. M.p. 102-6°.

Nitrile: C_4H_5N . MW, 67. B.p. 90-2°. D^{18} 0.7991. Insol. H_2O .

Fittig, Prehn, *Ann.*, 1877, 188, 47.

Faworsky, *J. prakt. Chem.*, 1895, 51, 552.

Brühl, *Ann.*, 1880, 200, 181.

Hope, Perkin, *J. Chem. Soc.*, 1911, 99, 773.

Fittig, Engelhorn, *Ann.*, 1880, 200, 70.

2-Methylacrylic Acid.

See Crotonic Acid and Isocrotonic Acid.

7-Methyladenine (6-Amino-7-methylpurine)



$C_6H_7N_5$

MW, 149

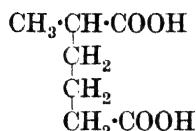
Powder from H_2O . M.p. 351°. Sol. 29 parts boiling H_2O . Sublimes. HNO_2 \rightarrow 7-methylhypoxanthine.

Fischer, *Ber.*, 1898, 31, 111.

9-Methyladenine.

Prisms from H_2O . M.p. 308-10°. Sol. 14 parts H_2O . HNO_2 \rightarrow 9-methylhypoxanthine.

Fischer, *Ber.*, 1898, 31, 109; 199, 32, 267.

1-Methyladipic Acid (*Pentane-1:4-dicarboxylic acid*)C₇H₁₂O₄ MW, 160

Cryst. M.p. 64°. B.p. 216–20°/28 mm., 209°/13 mm. Sol. H₂O, EtOH, Et₂O, CHCl₃. Less sol. C₆H₆. Spar. sol. pet. ether. k (first) = 4.1×10^{-5} at 24.4°. CrO₃ → succinic acid.

Di-Me ester: C₉H₁₆O₄. MW, 188. B.p. 116–17°/13 mm., 112–14°/10 mm. D₄²⁰ 1.054.

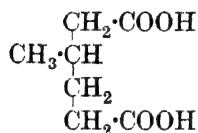
Di-Et ester: C₁₁H₂₀O₄. MW, 216. B.p. 132–4°/15 mm., 127–9°/13 mm. D₄²⁰ 1.010.

Diamide: C₇H₁₄O₂N₂. MW, 158. Cryst. M.p. 186.5°. Sol. H₂O. Spar. sol. org. solvents.

Monoanilide: C₁₃H₁₇O₃N. MW, 235. Cryst. from Et₂O–pet. ether. M.p. 122°. Very sol. EtOH. Sol. C₆H₆. Mod. sol. Et₂O. Spar. sol. pet. ether.

Dianilide: C₁₉H₂₂O₂N₂. MW, 310. Needles from toluene. M.p. 173–5°. Mod. sol. EtOH. Spar. sol. C₆H₆, toluene.

Bouveault, Locquin, *Bull. soc. chim.*, 1908, 3, 436, 451.

2-Methyladipic Acid (*Isopentane-1:4-dicarboxylic acid, 2-methylbutane-1:4-dicarboxylic acid*)C₇H₁₂O₄ MW, 160

d.

Cryst. from CHCl₃–C₆H₆. M.p. 93–94.5°. B.p. 230°/30 mm., 205°/8 mm. Sol. H₂O, EtOH, CHCl₃, Me₂CO, Et₂O, AcOEt. Mod. sol. C₆H₆, toluene, xylene. Spar. sol. pet. ether. $[\alpha]_D^{25} + 8.62^\circ$ in H₂O. k (first) = 4.01×10^{-5} at 25°.

Mono-Et ester: C₉H₁₆O₄. MW, 188. B.p. 164–6°/11 mm. D₀²⁰ 1.0830, D₀²⁰ 1.0673.

Di-Et ester: C₁₁H₂₀O₄. MW, 216. B.p. 257°/746 mm., 126.5°/10 mm. D₀²⁰ 1.0128, D₀²⁰ 0.9950. n_D^{20} 1.4335.

Dipropyl ester: C₁₃H₂₄O₄. MW, 244. B.p. 156°/25 mm. D₂₀²⁰ 0.964.

Di-isobutyl ester: C₁₅H₂₈O₄. MW, 272. B.p. 195–6°/30 mm., 169–71°/15 mm. D₁₈¹⁸ 0.947.

Dichloride: C₇H₁₀O₂Cl₂. MW, 197. B.p. 117–19°/10 mm. D₂₀²⁰ 1.2201. n_D^{20} 1.4709.

Diamide: C₇H₁₄O₂N₂. MW, 158. Cryst. from H₂O. M.p. 191°. Sol. H₂O. Insol. Et₂O.

Monoanilide: C₁₃H₁₇O₃N. MW, 235. Needles. M.p. 100–3°. Sol. MeOH, hot C₆H₆, hot toluene.

Dianilide: C₁₉H₂₂O₂N₂. MW, 310. Needles from EtOH.Aq. M.p. 203–4° (199–200°). Insol. C₆H₆.

Anhydride: b.p. 165°/1 mm.

Dihydrazide: needles. M.p. 136°. Sol. H₂O, boiling EtOH, Me₂CO.

l.

Cryst. M.p. 84.5°.

Dianilide: needles. M.p. 199–200°.

dl.

Needles from C₆H₆. M.p. 97° (89°).

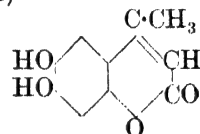
Semmler, *Ber.*, 1893, 26, 774.

Tiemann, Schmidt, *Ber.*, 1896, 29, 908.

Markownikoff, *Chem. Zentr.*, 1903, II, 287.

Harries, Neresheimer, *Chem. Zentr.*, 1916, II, 993.

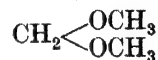
Schrauth, *Chem.-Ztg.*, 1929, 53, 41.

4-Methylaesculetin (6:7-Dihydroxy-4-methylcoumarin)C₁₀H₈O₄ MW, 192

Yellow needles from EtOH.Aq. M.p. 272–4°. Sol. hot H₂O, EtOH, AcOH, conc. H₂SO₄, dil. alkalis with blue fluor. FeCl₃ → green sol.

Vliet, *Organic Syntheses*, Collective Volume I, 352.

v. Pechmann, v. Krafft, *Ber.*, 1901, 34, 423.

Methylal (*Formaldehyde dimethyl acetal, dimethoxymethane, methylene dimethyl ether*)C₃H₈O₂ MW, 76

M.p. –105°. B.p. 41–2°. D₄²⁰ 0.885, D₄²⁰ 0.872. n_D^{18} 1.3589. Mol. b.p. elevation 21.1. Heat of comb. C_p 461.9 Cal., C_p 462.5 Cal., (vapour) C_p 476.1 Cal. Sol. 3 parts H₂O. Misc. with most org. solvents. HI → CH₃I + H·CHO.

Fischer, Giebe, *Ber.*, 1897, 30, 3054.

Brühl, *ibid.*, 159.

Berthelot, Délépine, *Compt. rend.*, 1900, 130, 1048.

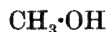
Timmermans, Martin, *Chem. Abstracts*, 1928, 22, 4024.

N-Methyl- α -alanine (1-Methylaminopropionic acid) $\text{C}_4\text{H}_9\text{O}_2\text{N}$

MW, 103

d-.
Needles + $1\text{H}_2\text{O}$ from EtOH. M.p. 300° .
Sol. H_2O , hot EtOH. Spar. sol. Me_2CO , AcOEt.
Insol. Et_2O , C_6H_6 . $[\alpha]_D^{20} + 5.6^\circ$ in H_2O .
B, HCl: m.p. $165-6^\circ$. $[\alpha]_D^{21} + 5.7^\circ$ in H_2O .*l*-.
Needles + $1\text{H}_2\text{O}$ from EtOH. M.p. about 300° . Similar solubilities to *d*-form. $[\alpha]_D^{20} - 5.9^\circ$ in H_2O .*dl*-.
Prisms from EtOH. Sinters at 280° , part. sublimes at 292° . Sol. hot EtOH. Spar. sol. H_2O . Insol. cold EtOH.*Et ester*: $\text{C}_6\text{H}_{13}\text{O}_2\text{N}$. MW, 131. B.p. $42-3^\circ/7$ mm. $D_4^{20} 0.9502$.
Methylamide: $\text{C}_5\text{H}_{12}\text{ON}_2$. MW, 116. M.p. 43° . B.p. $110^\circ/8$ mm. *B, HAuCl*: m.p. $159-65^\circ$. *B, H₂PtCl*: m.p. 201° .
B, HCl: m.p. 110° .
B, HNO: m.p. 126° .
B, H₂SO: m.p. $130-5^\circ$.Fischer, Lipschitz, *Ber.*, 1915, **48**, 364.Fischer, v. Mechel, *Ber.*, 1916, **49**, 1357.Lindenburg, *J. prakt. Chem.*, 1875, **12**, 246.Gansser, *Z. physiol. Chem.*, 1909, **61**, 26.**N-Methyl- β -alanine.**

See 2-Methylaminopropionic Acid.

Methyl Alcohol (Methanol, carbinol, hydroxy-methane) CH_4O

MW, 32

M.p. -93.9° . B.p. 64.1° , $59.4^\circ/610$ mm., $39.9^\circ/260$ mm., $15^\circ/73$ mm. $D_4^{20} 0.866$, $D_4^{20} 0.81$, $D_4^{20} 0.8006$, $D_4^{20} 0.7910$, $D_4^{20} 0.7964$. $n_D^{20} 1.3295$, $n_D^{25} 1.338$, $n_D^{30} 1.3312$, $n_D^{35} 1.3276$. Vap. press. at 0° 29.6 mm., at 10° 54.7 mm., at 20° 96 mm., at 30° 160 mm., at 40° 260.5 mm., at 50° 406 mm., at 60° 625 mm. Sp. heat at 20° 0.6 , of vapour at 350° 21.4 . Latent heat 292.2 Cal. Heat of comb. (liq.) 170.6 Cal., (vapour) 182.2 Cal. Viscosity at 25° 0.0056 . Crit. temp. 241.9° . Crit. press. 78.6 atm. Crit. density 0.2722 . Mol. b.p. elevation 8.4 . Misc. with H_2O with contraction of vol. and evolution of heat. Misc. with most org. solvents. When moist immiscible with pet. ether. Dissolves many inorganic salts. Combines with CaCl_2 . Burns with a luminous flame. In iron tube at

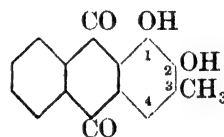
Diet. of Org. Comp.—II.

 $600^\circ \rightarrow \text{H} + \text{H}\cdot\text{CHO}$. In presence of finely divided Ni at $180^\circ \rightarrow \text{H}\cdot\text{CHO}$. Less easily oxidised than ethyl alcohol. When moist and exposed in air to sunlight $\rightarrow \text{H}\cdot\text{CHO}$. $\text{Na} \rightarrow$ sodium methoxide. $\text{HCl} + \text{ZnCl}_2 \rightarrow$ methyl chloride. $\text{Mg}_3\text{N}_2 \rightarrow$ trimethylamine + NH_3 . White P at $250^\circ \rightarrow \text{PH}_3 + \text{H}_3\text{PO}_4$. $\text{H}_2\text{SO}_4 \rightarrow$ dimethyl ether + methyl hydrogen sulphate + dimethyl sulphate. $\text{P}_2\text{O}_5 \rightarrow$ mixture of olefines. $\text{POCl}_3 \rightarrow$ methyl chloride + methyl metaphosphate + HCl . $\text{H}_2\text{S} + \text{ThO}_2$ at $300^\circ \rightarrow$ methyl mercaptan., CaC_2 at $60^\circ-250^\circ \rightarrow$ crotonylene + 1-butene. Irradiation by ultraviolet light $\rightarrow \text{H} + \text{CO} + \text{CO}_2$. Obtained anhyd. by dist. from metallic Ca.**Methyl-aldehyde-cyclohexane.**

See Hexahydrotoluic Aldehyde.

Methylaldehydoguaiacol.

See Hydroxymethoxytoluic Aldehyde.

3-Methyl-4-aldehydo-*o*-toluic.See under 6-Hydroxy-5-methoxy-*o*-toluic Aldehyde.**3-Methylalizarin** (1 : 2-Dihydroxy-3-methyl-anthraquinone) $\text{C}_{15}\text{H}_{10}\text{O}_4$

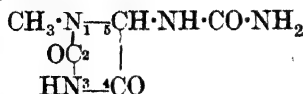
MW, 254

Cryst. M.p. 245° .*Diacetyl*: cryst. M.p. 162° .Mitter, Pal, *J. Indian Chem. Soc.*, 1930, **7**, 261.**4-Methylalizarin** (1 : 2-Dihydroxy-4-methyl-anthraquinone).*Di-Me ether*: $\text{C}_{17}\text{H}_{14}\text{O}_4$. MW, 282. Yellow needles from AcOH. M.p. 224° . Spar. sol. C_6H_6 , cold AcOH, pet. ether.Perkin, Weizmann, *J. Chem. Soc.*, 1906, **89**, 1660.**6-Methylalizarin** (1 : 2-Dihydroxy-6-methyl-anthraquinone).Yellow cryst. M.p. 220° .*Diacetyl*: cryst. M.p. 190° .Mitter, Biswas, *J. Indian Chem. Soc.*, 1928, **5**, 777.**7-Methylalizarin** (1 : 2-Dihydroxy-7-methyl-anthraquinone).Orange-red needles from AcOH or AcOEt. M.p. 216° . Sol. EtOH, Me_2CO , CHCl_3 , AcOH, AcOEt. Spar. sol. Et_2O , C_6H_6 . Insol. H_2O , ligroin. Sublimes.

Diacetyl: yellow needles from EtOH. M.p. 176°.

Niementowski, *Ber.*, 1900, **33**, 1632.

1-Methylallantoin (α -Methylallantoin)



$\text{C}_5\text{H}_8\text{O}_3\text{N}_4$ MW, 172

Cryst. M.p. 255–9° decomp. Sol. 262 parts boiling H_2O .

v. Loeben, *Ann.*, 1897, **298**, 186.

Fischer, *Ach. Ber.*, 1899, **32**, 2745.

3-Methylallantoin (β -Methylallantoin).

Prisms + H_2O from H_2O . M.p. 226–7°. HI \rightarrow 1-methylhydantoin.

See first reference above.

5-Methylallantoin.

See Pyvuril.

1-Methylallophanic Acid



$\text{C}_3\text{H}_6\text{O}_3\text{N}_2$ MW, 118

Plates from C_6H_6 . M.p. 146°.

Biltz, Jeltsch, *Ber.*, 1923, **56**, 1916.

3-Methylallophanic Acid

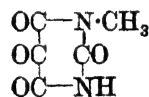


$\text{C}_3\text{H}_6\text{O}_3\text{N}_2$ MW, 118

Cryst. from AcOEt. M.p. 163°.

See previous reference.

Methylalloxan



$\text{C}_5\text{H}_4\text{O}_4\text{N}_2$ MW, 156

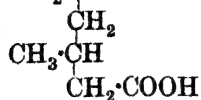
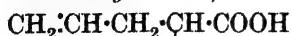
Cryst. from H_2O . M.p. about 156° decomp. Hot $\text{HNO}_3 \rightarrow$ methylparabanic acid. $\text{H}_2\text{S} \rightarrow$ dimethylalloxantin.

Fischer, *Ach. Ber.*, 1899, **32**, 2731.

Methylallylacetone.

See 1-Heptenone-5.

3-Methyl-1-allyladipic Acid (6-Methyl-1-heptene-4 : 7-dicarboxylic acid)



$\text{C}_{10}\text{H}_{10}\text{O}_4$ MW, 194

d.

Needles. M.p. 104°. B.p. 235°/20 mm. Spar. sol. H_2O , Et_2O . $[\alpha]_D^{20} + 27^\circ 53'$ in EtOH.

Di-Et ester: $\text{C}_{14}\text{H}_{24}\text{O}_4$. MW, 250. B.p. 155°/17 mm.

Haller, Desfontaines, *Compt. rend.*, 1903, **136**, 1614; 1905, **140**, 1206.

Methylallylamine



$\text{C}_4\text{H}_9\text{N}$ MW, 71

B.p. 64–6°. Misc. with H_2O .

$\text{B}_2\text{H}_2\text{PtCl}_6$: yellow cryst. M.p. 164°. Sol. hot H_2O . Insol. EtOH.

Partheil, v. Broich, *Ber.*, 1897, **30**, 619.

Methylallylaniline



$\text{C}_{10}\text{H}_{13}\text{N}$ MW, 147

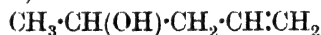
B.p. 213°/755 mm. D_4^{25} 0.9242.

Picrate: cryst. M.p. 91–2°.

v. Braun, *Ber.*, 1900, **33**, 2733.

Wedekind, *Ber.*, 1899, **32**, 524.

Methylallylcarbinol (1-Pentenol-4, 4-hydroxypentene-1)



$\text{C}_5\text{H}_{10}\text{O}$ MW, 86

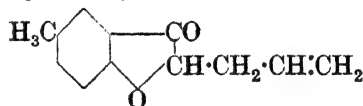
B.p. 115–16°/750 mm. Sol. 8 parts H_2O . D_0^{20} 0.834. n_D^{20} 1.425.

Acetyl: b.p. 133°/743 mm. D_0^{20} 0.891.

Wagner, Kuwschinow, *Ber.*, 1894, **27**, 2434.

Pariselle, *Compt. rend.*, 1912, **154**, 710.

5-Methyl-2-allylcoumaranone



$\text{C}_{12}\text{H}_{12}\text{O}_2$ MW, 188

Prisms from EtOH. M.p. 56–7°. Very sol. most org. solvents.

Semicarbazone: cryst. M.p. 200°.

p-Nitrophenylhydrazone: orange needles from EtOH. M.p. 165–7°.

Auwers, *Ber.*, 1928, **61**, 415.

Methyl allyl Ether

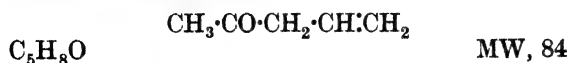


$\text{C}_4\text{H}_8\text{O}$ MW, 72

B.p. 46°, 42.5–43°/757 mm. D^{11} 0.77. n_D 1.3778–1.3803.

Irvine, Macdonald, Soutar, *J. Chem. Soc.*, 1915, **107**, 351.

Methyl allyl Ketone (1-Pentenone-4, 4-ketopentene-1, vinylacetone)

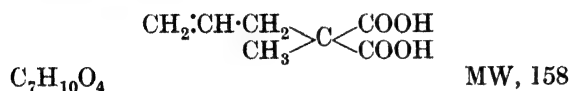


Liq. with unpleasant odour. B.p. 107–8°.

Semicarbazone : m.p. 144–5°.

Blaise, *Bull. soc. chim.*, 1905, **33**, 40.

Methylallylmalonic Acid

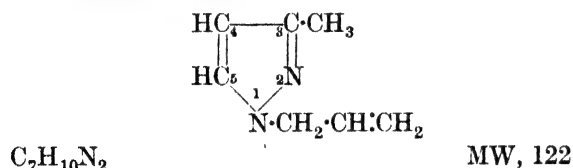


Cryst. from H_2O . M.p. 98–9° (74–6°).

Di-Et ester : $\text{C}_{11}\text{H}_{18}\text{O}_4$. MW, 214. Oil. B.p. 112–15°/17 mm.

Staudinger, Schneider, Scholtz, Strong, *Helv. Chim. Acta*, 1923, **6**, 301.

3-Methyl-1-allylpyrazole



Oil. B.p. 171°.

Picrate : plates or needles from MeOH. M.p. 77.5–78.5°. Very sol. EtOH, Et_2O .

Auwers, Bähr, *J. prakt. Chem.*, 1927, **116**, 97.

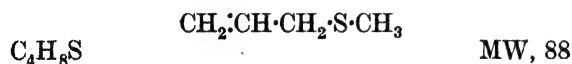
5-Methyl-1-allylpyrazole.

Oil. B.p. 181–2°.

Picrate : yellow needles from MeOH. M.p. 113–14°.

See previous reference.

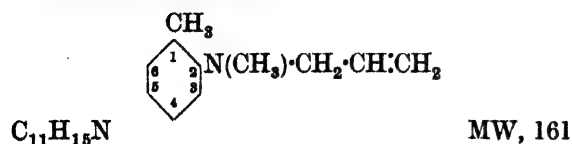
Methyl allyl sulphide



Oil. B.p. 91–3°.

Obermeyer, *Ber.*, 1887, **20**, 2925.

N-Methyl-N-allyl-o-toluidine



Oil. B.p. 215–20°.

Picrate : yellow needles from EtOH. M.p. 133–5°.

Wedekind, Oberheide, *Ber.*, 1904, **37**, 3896.

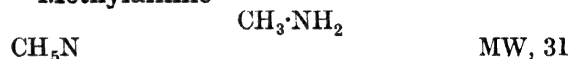
N-Methyl-N-allyl-p-toluidine.

B.p. 230–2°.

Picrate : yellowish-brown needles. M.p. 124°.

Wedekind, Oberheide, *Ber.*, 1904, **37**, 2719.

Methylamine



Gas with strong ammoniacal odour. B.p. 41.0°/4500 mm., – 7.55°/719 mm. 1 vol. H_2O dissolves 1153.9 vols. at 12.5°. $k = 5.0 \times 10^{-4}$ at 25°. D_4^{79} 0.7691, D_4^{108} 0.699. Crit. temp. 156.9°. Crit. press. 73.6 atm. Heat of comb. (gas) C_p 258.3 Cal., C_v 260.4 Cal., (liq.) C_p 258.1 Cal.

At 1200° $\rightarrow \text{NH}_3 + \text{HCN} + \text{CH}_4 + \text{H} + \text{N}$. Ox. (+ Cu) $\rightarrow \text{H}\cdot\text{CHO} + \text{NH}_3$. Chloranil + EtOH sol. of hydrochloride \rightarrow violet col. (distinction from NH_3). Stable to KMnO_4 . Used as refrigerant.

$B, \text{H}_2\text{O}$: liq. $D^{13.9}$ 0.8993.

$B, 3\text{H}_2\text{O}$: f.p. – 35.8°.

B, HCl : plates from EtOH. M.p. 225–6°. B.p. 225–30°/15 mm. Sol. EtOH. Insol. Me_2CO , Et_2O , CHCl_3 .

B, HBr : plates. M.p. 250–1° slight decomp. Sol. EtOH. Spar. sol. Me_2CO . Insol. Et_2O , CHCl_3 .

B, HI : plates from EtOH– CHCl_3 . M.p. about 260–70° (220°). Sol. EtOH. Insol. CHCl_3 , Et_2O .

B, HNO_3 : prisms. M.p. 99–100° (70°). $D_4^{100.7}$ 1.2607.

Formyl : see N-Methylformamide.

Acetyl : see N-Methylacetamide.

Diacetyl : methyldiacetamide. B.p. 192°. Misc. with H_2O . Insol. Et_2O .

N-Nitro : see Methylnitramine.

Di-d-tartrate : m.p. 170°.

Di-dl-tartrate : m.p. 188°.

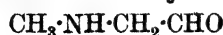
Nitromethane comp. : cryst. M.p. – 8 to – 7.5°.

Picrate : yellow plates or prisms from AcOEt. M.p. 215°.

Fischer, *Anleitung zur Darstellung organischer Präparate*, **9** [Braunschweig 1920], 33.

Marvel, Jenkins, *Organic Syntheses*, Collective Volume I, 340.

du Pont de Nemours, E.P., 384,714, (*Chem. Zentr.*, 1933, I, 2313).

MethylaminoacetaldehydeC₃H₇ON

MW, 73

Not known in free state.

Di-Me acetal: C₅H₁₁ON. MW, 101. Oil.
B.p. 140°/760 mm.

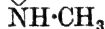
Di-Et acetal: methylaminoacetal. C₇H₁₅ON.
MW, 129. B.p. 167°.

Knorr, *Ber.*, 1899, **32**, 729.

Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1922, **121**, 1885.

Methylaminoacetic Acid.

See Sarcosine.

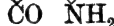
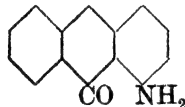
p-MethylaminoacetophenoneC₉H₁₁ON

MW, 149

Plates from H₂O. M.p. 58-9°. Sol. hot H₂O,
EtOH, Et₂O.

Staudinger, *Kon. Ann.*, 1911, **384**, 111.Klingel, *Ber.*, 1885, **18**, 2694.**ω-Methylaminoacetophenone.**

See N-Methylphenacylamine.

1-Methylamino-4-aminoanthraquinoneC₁₅H₁₂O₂N₂

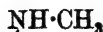
MW, 252

Violet plates from Py. M.p. 195°.

NN'-*Diacetyl*: brown needles from AcOH.
M.p. 278°.

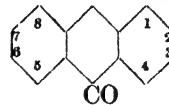
Bayer, D.R.P., 156,759, (*Chem. Zentr.*, 1905, I, 310).

Drescher, Thomas, U.S.P., 1,528,470,
(*Chem. Abstracts*, 1926, **20**, 425).

9-MethylaminoanthraceneC₁₅H₁₃N

MW, 207

Cryst. M.p. 90° (sinters at 85°). Very sol.
most org. solvents. Oxidises and decomposes
readily in air.

B, *HCl*: cryst. from EtOH. M.p. 225°.Meyer, Schlösser, *Ann.*, 1920, **420**, 133.**1-Methylaminoanthraquinone**C₁₅H₁₁O₂N

MW, 237

Yellowish-red needles. M.p. 170° (167°). Sol.
EtOH, C₆H₆, CHCl₃, AcOH. Fuming HCl →
yellow sol. Conc. H₂SO₄ → yellow sol.

Badische, D.R.P., 256, 515, (*Chem. Zentr.*, 1913, I, 866).Ullmann, Fodor, *Ann.*, 1911, **380**, 320.

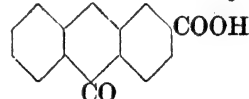
Society of Chemical Industry, Bâle,
Swiss P., 132,796, (*Chem. Abstracts*,
1930, **24**, 508).

2-Methylaminoanthraquinone.

Red needles from AcOH. M.p. 226-7°.
Sol. AcOH, toluene. Mod. sol. EtOH. Spar.
sol. Et₂O. Warm conc. H₂SO₄ → yellowish
green sol.

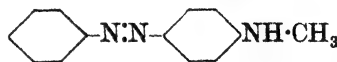
Bayer, D.R.P., 158,531, (*Chem. Zentr.*, 1905, I, 1517).Ullmann, Medenwald, *Ber.*, 1913, **46**, 1801.

Scottish Dyes, Ltd., E.P., 319,805, (*Chem. Abstracts*, 1930, **24**, 2612).

1-Methylaminoanthraquinone-2-carboxylic AcidC₁₆H₁₁O₄N

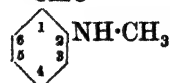
MW, 281

Bluish-red needles from AcOH. M.p. about
240° decomp. Alkali salts give bluish-red aq.
sols.

Badische, D.R.P., 247,411 (*Chem. Zentr.*, 1912, II, 213).**4-Methylaminoazobenzene**C₁₃H₁₃N₃

MW, 211

Red needles. M.p. 180°.

B, *HCl*: violet needles.Berju, *Ber.*, 1884, **17**, 1401.**o-Methylaminobenzaldehyde**C₈H₉ON

MW, 135

Yellow oil. B.p. 112°/10 mm. Sol. most org. solvents. Sol. HCl. D_4^{25} 1.1092. Volatile in steam.

Oxime: needles from pet. ether-ligroin. M.p. 50.5–51°. Very sol. EtOH, C_6H_6 . Less sol. H_2O .

$B_2H_2PtCl_6$: yellow needles. M.p. 200–1°.

Bamberger, *Ber.*, 1904, 37, 979.

p-Methylaminobenzaldehyde.

Rhombohedral from H_2O . M.p. 60–1° (57–8°). Sol. usual org. solvents. Sol. aq. bisulphite.

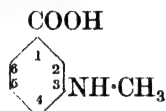
Boehringer, D.R.P., 108,026, (*Chem. Zentr.*, 1900, I, 1114).

Geigy, D.R.P., 103,578, (*Chem. Zentr.*, 1899, II, 927).

o-Methylaminobenzoic Acid.

See N-Methylanthranilic Acid.

m-Methylaminobenzoic Acid



$C_8H_9O_2N$

MW, 151

Plates from pet. ether. M.p. 127°. Very sol. C_6H_6 , EtOH, Me_2CO , $CHCl_3$. Insol. cold H_2O , Et_2O , ligroin. Amphoteric. k (acid) = 8×10^{-6} ; (base) = 1.2×10^{-11} .

B,HI: cryst. from EtOH. M.p. 215° decomp. Sol. H_2O , EtOH.

Me ester: $C_9H_{11}O_2N$. MW, 165. Cryst. M.p. 72°. Sol. Et_2O . Insol. H_2O .

Et ester: $C_{10}H_{13}O_2N$. MW, 179. *B,HCl*: cryst. from Me_2CO . M.p. 137°.

Houben, Brassert, *Ber.*, 1910, 48, 209.

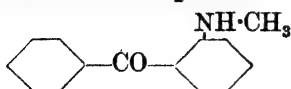
p-Methylaminobenzoic Acid.

Cryst. from EtOH.Aq. or C_6H_6 . M.p. 168° (155–7°). Sol. EtOH, hot H_2O , Et_2O , hot C_6H_6 , AcOEt. $FeCl_3 \rightarrow$ reddish-violet col.

Me ester: plates from EtOH.Aq. M.p. 95.5° (75–6°). Sol. EtOH, Et_2O . Insol. H_2O . $k = 2.08 \times 10^{-12}$ at 25°.

Klaus, Baudisch, *Ber.*, 1918, 51, 1043.

2-Methylaminobenzophenone



$C_{14}H_{13}ON$

MW, 211

Yellow cryst. from pet. ether. M.p. 69° (66°). B.p. 280–90°, 185–7°/12 mm. Sol. EtOH, C_6H_6 , AcOH.

B,HI: cryst. from H_2O . M.p. 184–6°.

Ullmann, Bleier, *Ber.*, 1902, 35, 4276.

Staudinger, Kon, *Ann.*, 1911, 384, 103.

2-Methylaminobenzthiazole (See Note under 2-Aminobenzthiazole)



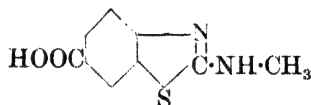
$C_8H_8N_2S$

MW, 164

Prisms from EtOH. M.p. 138°.

Hunter, *J. Chem. Soc.*, 1926, 1394.

2-Methylaminobenzthiazole-6-carboxylic Acid



$C_9H_8O_2N_2S$

MW, 208

Cryst. from EtOH-AcOEt. Does not melt at 298°. Sol. alkalis.

Et ester: $C_{11}H_{12}O_2N_2S$. MW, 236. Plates from EtOH-AcOEt. M.p. 169°. *Acetyl*: prisms from MeOH. M.p. 174°. *Hydrotribromide*: orange cryst. M.p. 137–8° decomp.

Hunter, Parken, *J. Indian Chem. Soc.*, 1932, 9, 357.

α -Methylaminobenzyl Alcohol (α -Hydroxy-N-methylbenzylamine)



$C_8H_{11}ON$

MW, 137

Yellowish-grey cryst. from pet. ether. M.p. 180° decomp. Sol. EtOH, Et_2O .

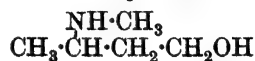
Picrate: yellow cryst. M.p. 238° decomp.

Wood, Lilley, *J. Chem. Soc.*, 1925, 127, 96.

Methyl o-aminobenzyl Ether.

See under o-Aminobenzyl Alcohol.

3-Methylaminobutyl Alcohol



$C_5H_{13}ON$

MW, 103

B.p. 65°/14 mm. Sol. H_2O .

Mannich, Horkheimer, *Arch. Pharm.*, 1926, 264, 167.

Methyl 4-aminobutyl sulphide (4-Methylmercapto-butylamine)



$C_5H_{13}NS$

MW, 119

B.p. 188–9°. Misc. with H_2O , EtOH, Et_2O .

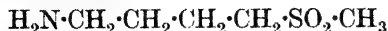
B,HCl: plates from dry Me_2CO . M.p. 153–4°. *Oxalate*: cryst. from EtOH.Aq. Decomp. at 202°.

Picrate: m.p. 116–18°.

Picrolonate: decomp. at 172–4°.

Schneider, Kaufmann, *Ann.*, 1912, **392**, 9.

Methyl 4-aminobutyl sulphone (4-Methylsulphonbutylamine)



$\text{C}_5\text{H}_{13}\text{O}_2\text{NS}$ MW, 151

Cryst. M.p. 42°. B.p. 165°/4 mm. Very sol. H_2O , EtOH. Insol. Et_2O . Very hygroscopic.

B, HCl: plates from EtOH. M.p. 160°. Very sol. H_2O . Insol. cold EtOH.

B, HgAuCl: plates from MeOH. M.p. 187–9°. Very sol. H_2O .

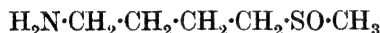
B, H, PtCl: yellow cryst. from EtOH. Aq. Decomp. at 205–7°.

Picrate: decomp. at 216°.

Picrolonate: m.p. 144°. Decomp. at 205°.

See previous reference.

Methyl 4-aminobutyl sulphoxide



$\text{C}_5\text{H}_{13}\text{ONS}$ MW, 135

Decomp. on dist.

B, HCl: very hygroscopic.

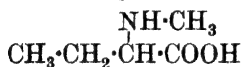
Oxalate: plates from EtOH. M.p. 174–9°. Very hygroscopic.

Picrate: m.p. 149°.

Picrolonate: m.p. 195° decomp.

See previous reference.

1-Methylaminobutyric Acid



$\text{C}_5\text{H}_{11}\text{O}_2\text{N}$ MW, 117

dl.

Prisms + $1\text{H}_2\text{O}$ from H_2O . Sublimes readily at 290°. Very sol. H_2O . Spar. sol. EtOH. Insol. Et_2O . Sweet taste.

B, HCl: cryst. M.p. 150° decomp. Very sol. H_2O . Sol. EtOH. Insol. Et_2O .

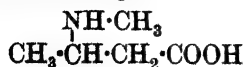
B, H, SO: needles from EtOH. M.p. 199–200°. Very sol. H_2O .

Et ester: $\text{C}_7\text{H}_{15}\text{O}_2\text{N}$. MW, 145. B.p. 51–2°. D^{10}_{20} 0.9348.

B, H, PtCl: cryst. Decomp. at 210°.

Gansser, *Z. physiol. Chem.*, 1909, **61**, 475, Knoop, Oesterlin, *Z. physiol. Chem.*, 192, **148**, 294.

2-Methylaminobutyric Acid



$\text{C}_5\text{H}_{11}\text{O}_2\text{N}$ MW, 117

dl.

Cryst. + $1\text{H}_2\text{O}$. M.p. 86–7°, anhyd. 141–2°.

Me ester: $\text{C}_6\text{H}_{13}\text{O}_2\text{N}$. MW, 131. B.p. 66°/15 mm.

Et ester: $\text{C}_7\text{H}_{15}\text{O}_2\text{N}$. MW, 145. B.p. 72°/12.5 mm. D^{20}_{20} 0.92817. n^{20}_D 1.42501.

Lactam: b.p. 73–4°/12 mm.

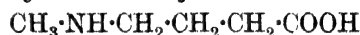
Methylamide: $\text{C}_6\text{H}_{15}\text{ON}_2$. MW, 131. B.p. 146°/56 mm., 134–6°/10 mm.

Scheibler, Magasanik, *Ber.*, 1915, **48**, 1812.

Breckpot, *Bull. soc. chim. Belg.*, 1923, **32**, 431.

Morsch, *Monatsh.*, 1932, **60**, 64.

3-Methylaminobutyric Acid



$\text{C}_5\text{H}_{11}\text{O}_2\text{N}$ MW, 117

Needles from EtOH– Et_2O . M.p. 146° (143–5°). Very sol. H_2O . Sol. 5 parts EtOH. Easily decomp.

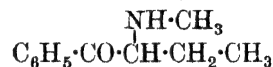
B, HCl: plates from H_2O . M.p. 125°. Very sol. H_2O .

B, H, PtCl: cryst. Decomp. at 202°.

p-Toluenesulphonyl: m.p. 96–8°.

Gansser, *Z. physiol. Chem.*, 1909, **61**, 53.

β -Methylaminobutyrophenone

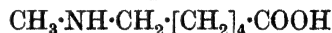


$\text{C}_{11}\text{H}_{15}\text{ON}$ MW, 177

Cryst. M.p. 190–2°.

Abbott Laboratories, U.S.P., 1,767,423, (*Chem. Abstracts*, 1930, **24**, 4359).

5-Methylaminocaproic Acid



$\text{C}_7\text{H}_{15}\text{O}_2\text{N}$ MW, 145

Cryst. + $1\frac{1}{2}\text{H}_2\text{O}$ from H_2O , m.p. about 67°. Cryst. anhyd. from EtOH– Et_2O , m.p. 132°. Very sol. H_2O , EtOH. Spar. sol. Me_2CO , AcOEt. Insol. Et_2O , C_6H_6 , pet. ether. Very hygroscopic.

Thomas, Goerne, *Z. physiol. Chem.*, 1919, **104**, 77.

Ruzicka, *Helv. Chim. Acta*, 1921, **4**, 481.

β -Methylaminocinnamic Acid

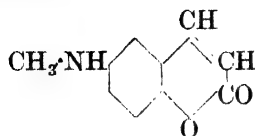


$\text{C}_{10}\text{H}_{11}\text{O}_2\text{N}$ MW, 177

Et ester: $\text{C}_{12}\text{H}_{15}\text{O}_2\text{N}$. MW, 205. B.p. 130–4°/2 mm. decomp.

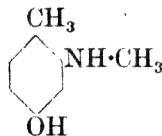
Décombe, *Ann. chim.*, 1932, **18**, 124.

6-Methylaminocoumarin

 $C_{10}H_9O_2N$

MW, 175

Yellow needles from pet. ether. M.p. 105–6°.

Morgan, Micklethwait, *J. Chem. Soc.*, 1904, 85, 1237.2-Methylamino-*p*-cresol $C_8H_{11}ON$

MW, 137

Cryst. from C_6H_6 -ligroin. M.p. about 108°.

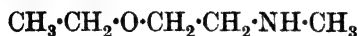
Badische, D.R.P., 69,596.

2-Methylaminocrotonic Acid (*Methyl-iminobutyric acid*) $C_7H_{13}O_2N$

MW, 143

Me ester: $C_8H_{15}O_2N$. MW, 157. Cryst. from pet. ether. M.p. 60–5°. Sol. EtOH, C_6H_6 , Et_2O . Spar. sol. pet. ether. Insol. H_2O .*Et ester*: $C_9H_{17}O_2N$. MW, 171. Solidifies in freezing mixture. B.p. 215°, 133°/50 mm.Knoevenagel, Reinecke, *Ber.*, 1899, 32, 420 (*Note*).Korschun, Roll, *Bull. soc. chim.*, 1923, 33, 1106.

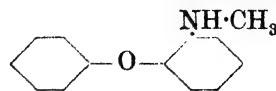
Methylamino-cyclohexane.

See *N*-Methylcyclohexylamine.2-Methylaminodiethyl Ether (*Methyl-2-ethoxyethyl-amine*) $C_5H_{13}ON$

MW, 103

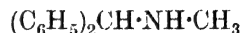
B.p. 114–15°/744 mm. D_4^{20} 0.8363. n_D^{20} 1.4147. Reacts alkaline. Misc. with H_2O , EtOH, Et_2O . $B,HAuCl_4$: yellow needles. M.p. 127°. B_2, H_2PtCl_6 : needles. M.p. 208° decomp.*Picrate*: prisms from H_2O . M.p. 119°.*Picrolonate*: yellow needles. M.p. 111°.Knorr, Meyer, *Ber.*, 1905, 38, 3133.

2-Methylaminodiphenyl Ether

 $C_{13}H_{13}ON$

MW, 199

M.p. 48°. B.p. 170°/13 mm.

 B, HCl : cryst. M.p. 134°.*Picrate*: cryst. M.p. 149°.v. Braun, Weissbach, *Ber.*, 1932, 65, 1579.α-Methylaminodiphenylmethane (*Methyl-benzhydrylamine*) $C_{14}H_{11}N$

MW, 197

Cryst. from pet. ether. M.p. 40°. B.p. 168°/20 mm.

 B, HCl : needles. M.p. 238°. Sol. H_2O , EtOH. B, HNO_3 : plates from EtOH. M.p. 146°.Busch, Leefhelm, *J. prakt. Chem.*, 1908, 77, 22.Semper, Lichtenstadt, *Ber.*, 1918, 51, 934.2-Methylaminoethyl Alcohol (*N*-Methylethanolamine, *methyl-hydroxyethylamine*) C_3H_9ON

MW, 75

Thick oil. B.p. 169–70°, 159°/747 mm. Misc. with H_2O , EtOH, Et_2O . D_4^{20} 0.937. n_D^{20} 1.4385. Strongly basic. $B,HAuCl_4$: prisms. M.p. 145–6°. Sol. H_2O . B_2, H_2PtCl_6 : plates from H_2O . Decomp. at 125–30°.*Picrate*: cryst. M.p. 148–50°.Knorr, Matthes, *Ber.*, 1898, 25, 1069.Chemische Fabrik. auf Actien, E.P., 285,932, (*Chem. Abstracts*, 1929, 23, 242).

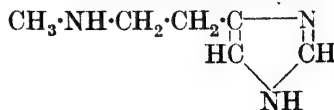
β-Methylaminoethylanisole.

See under Methyl-hydroxyphenylethyl-amine.

Methyl 2-aminoethyl Ether.

See 2-Methoxyethylamine.

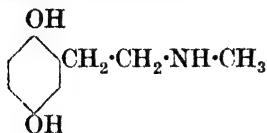
4-β-Methylaminoethylglyoxaline

 $C_6H_{11}N_3$

MW, 125

 $B, 2HCl$: needles from EtOH. M.p. 176–7°. Very sol. H_2O . $B, 2HBr$: needles from EtOH. M.p. 167°.*Dipicrate*: pale yellow needles from H_2O . M.p. 188°.Garforth, Pyman *J. Chem. Soc.*, 1935, 491.

β-Methylaminoethylhydroquinone (*Methyl-2:5-dihydroxyphenylethyl-amine*)



$C_9H_{13}O_2N$

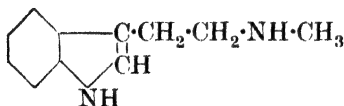
MW, 167

B.HCl: plates from Me_2CO-Et_2O or $EtOH-Et_2O$. M.p. 128° . Very sol. H_2O , $EtOH$, $AcOH$, conc. HCl . Spar. sol. Et_2O . $FeCl_3 \rightarrow$ transient pale green col. Reduces cold NH_3 , $AgNO_3$. Alk. sols rapidly blacken.

Di-Me ether: $C_{11}H_{17}O_2N$. MW, 195. B.p. $155^\circ/8$ mm. Spar. sol. H_2O . D_4^{25} 1.0545. n_D^{25} 1.5278. Reacts strongly alkaline. *B.HCl*: needles from $EtOH-Et_2O$. M.p. 110° . Very sol. H_2O , $EtOH$. Spar. sol. Et_2O . *B.HI*: pearly plates from $EtOH-Et_2O$. M.p. 137° .

Buck, *J. Am. Chem. Soc.*, 1932, **54**, 3663.

3-[ω-Methylaminoethyl]-indole (*N-Methyl-tryptamine*)



$C_{11}H_{14}N_2$

MW, 174

Cryst. M.p. 90° .

B.HCl: m.p. 180° .

Benzoyl deriv.: needles. M.p. 117° .

m-Chlorobenzoyl: prisms. M.p. 153° .

p-Nitrobenzoyl: golden-yellow plates. M.p. 134° .

Phenylcarbamyl deriv.: m.p. 153° .

Picrate: m.p. 191° .

Manske, *Chem. Abstracts*, 1932, **26**, 725.

β-Methylaminoethylphenol.

See *Methyl-hydroxyphenylethyl-amine*.

6-β-Methylaminoethylpiperonal.

See *Hydrastinine*.

6-β-Methylaminoethyl-veratric Aldehyde.

See *Lodal*.

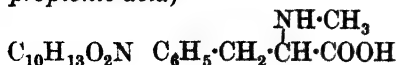
4-β-Methylaminoethylveratrol.

See *N-Methylhomoveratrylamine*.

1-Methylaminoglutaric Acid.

See *N-Methylglutamic Acid*.

α-Methylaminohydrocinnamic Acid (*N-Methylphenyl-α-alanine*, *1-methylamino-2-phenylpropionic acid*)



MW, 179

d-.

Needles from H_2O . Sublimes. Sol. hot H_2O , $EtOH$, $MeOH$. Spar. sol. other org. solvents. Sol. dil. acids and alkalis. $[\alpha]_D^{18} - 48.4^\circ$ in $N/NaOH$, $[\alpha]_D^{20} - 17.7^\circ$ in N/HCl .

l-.

Needles from H_2O . $[\alpha]_D^{18} + 49.7^\circ$ in $0.1N/NaOH$.

dl-.

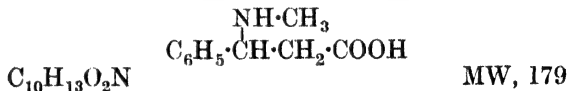
Plates from H_2O . Sublimes at $252-4^\circ$ with slight decomp.

Fischer, Lipschitz, *Ber.*, 1915, **48**, 372.

Fischer, v. Mechel, *Ber.*, 1916, **49**, 1359.

Friedmann, Gutmann, *Biochem. Z.*, 1910, **27**, 493.

β-Methylaminohydrocinnamic Acid (*2-Methylamino-2-phenylpropionic acid*)



Cryst. from $EtOH$ or $MeOH$. M.p. $176-176.5^\circ$ ($168.5-169^\circ$). Very sol. HCl . Sol. H_2O . Spar. sol. Me_2CO , Et_2O , C_6H_6 , $CHCl_3$.

Et ester: $C_{12}H_{17}O_2N$. MW, 207. Oil. B.p. $142.5^\circ/10.5$ mm. Sol. usual org. solvents. Spar. sol. H_2O .

Methylamide: $C_{11}H_{16}ON_2$. MW, 192. Solid. B.p. $195-6^\circ/9.5$ mm. decomp. *Oxalate*: cryst. from $EtOH-Et_2O$. M.p. $154.5-155^\circ$ decomp.

Evans, Johnson, *J. Am. Chem. Soc.*, 1930, **52**, 5003.

Morsch, *Monatsh.*, 1932, **61**, 308.

o-Methylaminohydrocinnamic Acid.

See under *Hydrocarbostyryl*.

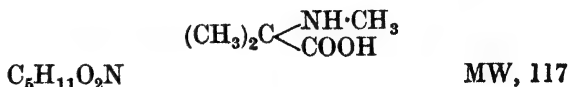
Methyl-2-aminoisobutylcarbinol.

See *Diacetonalkamine*.

Methyl 2-aminoisobutyl Ketone.

See *Diacetonamine*.

1-Methylaminoisobutyric Acid



Needles from $EtOH$. Sublimes at 272° . Sol. about 50 parts boiling $EtOH$.

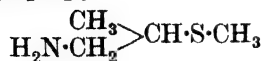
Nitrile: $C_5H_{10}N_2$. MW, 98. Oil. B.p. 140° , $63-5^\circ/28$ mm. Sol. H_2O .

Gabriel, *Ber.*, 1914, **47**, 2923.

1-Methylaminoisocaproic Acid.

See *N-Methyl-leucine*.

Methyl 1-aminoisopropyl sulphide (2-Methylmercaptopropylamine)



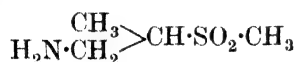
$\text{C}_4\text{H}_{11}\text{NS}$ MW, 105

B.p. $158^\circ/763$ mm. Misc. with H_2O , EtOH, Et_2O , AcOEt. Insol. pet. ether. Reacts strongly alkaline. Absorbs CO_2 from air. $\text{Ba}(\text{MnO}_4)_2 \longrightarrow$ sulphone.

Picrate: cryst. M.p. $133-4^\circ$.

Mylius, *Ber.*, 1916, **49**, 1099.

Methyl 1-aminoisopropyl sulphone (2-Methylsulphonpropylamine)



$\text{C}_4\text{H}_{11}\text{O}_2\text{NS}$ MW, 137

Oil. B.p. about $140^\circ/4$ mm. Sol. H_2O . Reacts alkaline. Absorbs CO_2 from the air. Non-volatile in steam.

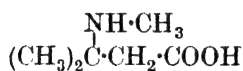
B, HCl: needles from EtOH. M.p. $111-12^\circ$.

Oxalate: needles. M.p. $181-2^\circ$ decomp. Sol. H_2O .

Picrate: cryst. M.p. $160-1^\circ$.

See previous reference.

2-Methylaminoisovaleric Acid



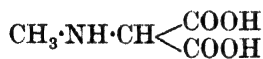
$\text{C}_6\text{H}_{13}\text{O}_2\text{N}$ MW, 131

Et ester: $\text{C}_8\text{H}_{17}\text{O}_2\text{N}$. MW, 159. B.p. $74.5-75.5^\circ/14$ mm.

Methylamide: $\text{C}_7\text{H}_{16}\text{ON}_2$. MW, 144. B.p. $138-40^\circ/15$ mm.

Philippi, Galter, *Monatsh.*, 1929, **51**, 263.

Methylaminomalonic Acid



$\text{C}_4\text{H}_7\text{O}_4\text{N}$ MW, 133

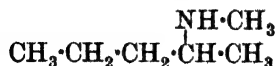
Plates from H_2O . Decomp. at $137-42^\circ$.

Knoop, Oesterlin, *Z. physiol. Chem.*, 1927, **170**, 208.

1-Methylaminopentane.

See *N*-Methyl-*n*-amylamine.

2-Methylaminopentane



$\text{C}_6\text{H}_{15}\text{N}$ MW, 101

B.p. $103-4^\circ/754$ mm. D_{20}^{20} 0.947.

$\text{B}_2\text{H}_2\text{PtCl}_6$: yellowish-red needles. M.p. 137.5° .

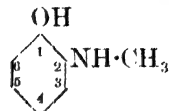
Picrate: cryst. M.p. $77-8^\circ$.

Löffler, *Ber.*, 1910, **43**, 2045.

3-Methylaminopentane.

See *N*-Methyl-*sec*.-*n*-amylamine.

***o*-Methylaminophenol** (*o*-Hydroxy-methyl-aniline)



$\text{C}_7\text{H}_9\text{ON}$ MW, 123

Plates from C_6H_6 -pet. ether. M.p. $96-7^\circ$ ($86-7^\circ$). FeCl_3 in $\text{HCl} \longrightarrow$ deep reddish-brown col.

Me ether: see *N*-Methyl-*o*-anisidine.

Lees, Shedden, *J. Chem. Soc.*, 1903, **83**, 756.

***m*-Methylaminophenol** (*m*-Hydroxy-methyl-aniline).

Liq. Solidifies on standing. B.p. $190^\circ/40$ mm., $170^\circ/12$ mm. Very sol. EtOH, Et_2O , C_6H_6 , AcOEt. Spar. sol. cold H_2O , ligroin. Sol. acids and alkalis.

Badische, D.R.P., 48,151.

Gnehm, Scheutz, *J. prakt. Chem.*, 1933, **63**, 422.

***p*-Methylaminophenol** (*p*-Hydroxy-methyl-aniline).

Needles from C_6H_6 . M.p. 87° .

Me ether: see *N*-Methyl-*p*-anisidine.

Et ether see *N*-Methyl-*p*-phenetidine.

$\text{B}_2\text{H}_2\text{SO}_4$: metol. Needles from H_2O . M.p. $250-60^\circ$. Sol. 25 parts H_2O at 25° . Photographic developer.

Acetyl: needles from pet. ether. M.p. 43° . B.p. $168.5^\circ/9$ mm. FeCl_3 gives no col. Acid $\text{FeCl}_3 \longrightarrow$ benzoquinone on warming. *B, HCl*: plates from EtOH- Et_2O . M.p. 200° . *Picrate*: yellow needles from EtOH. M.p. 157.5° . Insol. C_6H_6 .

Benzoyl: prisms from 50% EtOH. M.p. $173-4^\circ$. Sol. EtOH, AcOH. Spar. sol. hot C_6H_6 . Insol. ligroin.

p-Toluenesulphonyl: prisms from C_6H_6 -ligroin. M.p. 135° .

Harger, *J. Am. Chem. Soc.*, 1919, **41**, 273.

Galatis, *Ber.*, 1927, **60**, 1399.

MacLeester, U.S.P., 1,882,437, (*Chem. Abstracts*, 1933, **27**, 736).

Sommer, Nassau, U.S.P., 1,886,449, (*Chem. Abstracts*, 1933, **27**, 1363).

α -Methylaminophenylacetic Acid (N-Methyl-1-phenylglycine, 1-phenylsarcosine)

$$\begin{array}{c} \text{NH}\cdot\text{CH}_3 \\ | \\ \text{C}_6\text{H}_5\cdot\text{CH}\cdot\text{COOH} \end{array}$$

$\text{C}_9\text{H}_{11}\text{O}_2\text{N}$ MW, 165

Leaflets from H_2O . Sublimes at 274° without melting. Spar. sol. EtOH, Et_2O , cold H_2O .

Et ester: $\text{C}_{11}\text{H}_{15}\text{O}_2\text{N}$. MW, 193. B.p. $136^\circ/10$ mm. Very spar. sol. H_2O .

Amide: $\text{C}_9\text{H}_{12}\text{ON}_2$. MW, 164. Leaflets. M.p. 157° .

Tiemann, Piest, *Ber.*, 1881, **14**, 1982.

Knoop, *Ber.*, 1919, **52**, 2269.

Fourneau, Vila, *Bull. soc. chim.*, 1911, **9**, 985.

2-Methylamino-1-phenylpropanol-1.

See Ephedrine.

4-Methyl-2-[*p*-aminophenyl]-quinoline.

See Flavaniline.

Methyl aminophenyl sulphide.

See under Aminoethiophenol.

1-Methylaminopropionic Acid.

See N-Methyl- α -alanine.

2-Methylaminopropionic Acid (N-Methyl- β -alanine)

$$\text{CH}_3\cdot\text{NH}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{COOH}$$

$\text{C}_4\text{H}_9\text{O}_2\text{N}$ MW, 103

Plates + $1\text{H}_2\text{O}$ from EtOH. M.p. $99-100^\circ$. Sol. H_2O .

B, HCl: needles from EtOH.Aq. M.p. 105° .

B, H₂SO₄: needles from EtOH. M.p. 130° . Very sol. H_2O .

B, H₂PtCl₆: orange-yellow cryst. from H_2O . M.p. 196° decomp. Very sol. hot H_2O . Insol. EtOH.

Me ester: $\text{C}_5\text{H}_{11}\text{O}_2\text{N}$. MW, 117. B.p. $50^\circ/11$ mm.

Et ester: $\text{C}_6\text{H}_{13}\text{O}_2\text{N}$. MW, 131. B.p. $59-61^\circ/4$ mm., $58^\circ/8$ mm. D^{20}_4 0.9669, D^{20}_{20} 1.0082. n^{20}_D 1.4443. *B, HCl*: cryst. M.p. $59-60^\circ$.

Gansser, *Z. physiol. Chem.*, 1909, **61**, 39.

Morsch, *Monatsh.*, 1933, **63**, 220.

Prill, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 1238.

β -Methylaminopropiophenone (Methyl-1-benzoyl-ethyl-amine, 1-methylaminoethyl phenyl ketone)

$$\begin{array}{c} \text{NH}\cdot\text{CH}_3 \\ | \\ \text{C}_6\text{H}_5\cdot\text{CO}\cdot\text{CH}\cdot\text{CH}_3 \end{array}$$

$\text{C}_{10}\text{H}_{13}\text{ON}$ MW, 163

Yellow oil. B.p. $120-1^\circ/11$ mm.

B, HCl: m.p. 179° .

B, HAuCl₄: needles. M.p. 120° .

B, H₂PtCl₆: red cryst. from H_2O . M.p. $191-2^\circ$.

Picrate: cryst. from EtOH. M.p. 138° .

Skita, Keil, Baesler, *Ber.*, 1933, **66**, 862.

Eberhard, *Arch. Pharm.*, 1915, **253**, 81.

γ -Methylaminopropiophenone (Methyl-2-benzoyl-ethyl-amine, 2-methylaminoethyl phenyl ketone)

$$\text{C}_6\text{H}_5\cdot\text{CO}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{NH}\cdot\text{CH}_3$$

$\text{C}_{10}\text{H}_{13}\text{ON}$ MW, 163

B, HCl: plates from Me_2CO . M.p. $139-41^\circ$. Very sol. H_2O , EtOH, CHCl_3 . Less sol. Me_2CO .

Mannich, Heilner, *Ber.*, 1922, **55**, 363.

3-Methylaminopropyl Alcohol (N-Methyl-3-hydroxypropylamine)

$$\text{CH}_3\cdot\text{NH}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{OH}$$

$\text{C}_4\text{H}_{11}\text{ON}$ MW, 89

B.p. $74-7^\circ/2.5$ mm. D^{20}_4 0.9315. n^{27}_D 1.4418. Sol. H_2O .

Benzoyl: b.p. $144-5^\circ/10$ mm.

v. Braun, Braunsdorf, *Ber.*, 1921, **54**, 690.

Pierce, *J. Am. Chem. Soc.*, 1928, **50**, 242.

3-Methylaminopropylene Glycol (Methyl-2:3-dihydroxypropyl-amine, 1-methylamino-2:3-propandiol)

$$\text{CH}_3\cdot\text{NH}\cdot\text{CH}_2\cdot\text{CH}(\text{OH})\cdot\text{CH}_2\cdot\text{OH}$$

$\text{C}_4\text{H}_{11}\text{O}_2\text{N}$ MW, 105

Oil. B.p. $239-41^\circ/748$ mm. Sol. H_2O , EtOH. Spar. sol. Me_2CO , Et_2O , AcOEt. Insol. C_6H_6 . Absorbs H_2O and CO_2 from the air.

Picrolonate: exists in two forms. (i) Orange prisms from EtOH. M.p. 212° . Very spar. sol. EtOH. (ii) Cryst. from EtOH. M.p. 145° . More sol. than first form.

Knorr, Knorr, *Ber.*, 1899, **32**, 754.

Methyl 3-aminopropyl sulphide (3-Methyl-mercaptopropylamine)

$$\text{H}_2\text{N}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{S}\cdot\text{CH}_3$$

$\text{C}_4\text{H}_{11}\text{NS}$ MW, 105

B.p. 170° . Misc. with H_2O , EtOH, Et_2O . Volatile in steam.

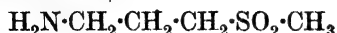
B, HCl: needles. M.p. 136° . Very sol. H_2O , EtOH. Spar. sol. Me_2CO . Hygroscopic.

Oxalate: cryst. Decomp. at 208° .

Picrate: cryst. M.p. $126-7^\circ$.

Picrolonate: cryst. M.p. $184-5^\circ$.

Schneider, *Ann.*, 1910, **375**, 245

Methyl 3-aminopropyl sulphone (3-Methylsulphonpropylamine)C₄H₁₁O₂NS

MW, 137

Cryst. M.p. 44°. B.p. 165–8°/6 mm. Very sol. H₂O. Sol. EtOH. Insol. Et₂O. Very hygroscopic. Reacts strongly alkaline. Fuming HNO₃ → methane-sulphonic acid.

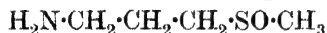
B, HCl: prisms from EtOH. M.p. 146°. Very sol. H₂O. Sol. 200 parts cold EtOH, 25 parts boiling EtOH.

B₂, H₂PtCl₆: orange plates from EtOH.Aq. Decomp. at 234°. Very sol. H₂O.

Picrate: cryst. M.p. 190–2°.

Picrolonate: cryst. M.p. 216°.

Schneider, *Ann.*, 1910, 375, 225.

Methyl 3-aminopropyl sulphoxideC₄H₁₁ONS

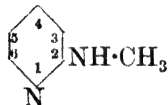
MW, 121

Oxalate: plates. M.p. 197°. Very sol. H₂O. Spar. sol. EtOH.

Picrate: cryst. M.p. 143°.

Picrolonate: cryst. M.p. 210° decomp.

Schneider, *Ann.*, 1912, 386, 343.

2-Methylaminopyridine (Methyl- α -pyridylamine)C₆H₈N₂

MW, 108

M.p. 15°. B.p. 200–1°, 90°/9 mm.

Benzoyl: m.p. 61–2°. B.p. 200°/11 mm.

Picrate: orange-yellow needles from H₂O. M.p. 190°.

Tschitschibabin, Konowalowa, Konowalowa, *Ber.*, 1921, 54, 816.

Tschitschibabin, Knunjanz, *Ber.*, 1928, 61, 2215.

4-Methylaminopyridine (Methyl- γ -pyridylamine).

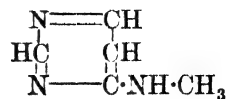
Cryst. M.p. 115–18° (108–10°). Sol. H₂O, EtOH, Et₂O, C₆H₆. Not hygroscopic.

B₂, H₂PtCl₆: orange-red needles from H₂O. M.p. 232° (214–15°).

Picrate: light yellow prisms or needles from H₂O. M.p. 172° (168.5–169°).

Tschitschibabin, Ossetrova, *Ber.*, 1925, 58, 1711.

Koenigs, Friedrich, Jurany, *ibid.*, 2574.

4-Methylaminopyrimidine (6-Methylaminopyrimidine, 4-methylamino-1:3-diazine)C₅H₇N₃

MW, 109

Cryst. M.p. 74–5°. Reacts strongly alkaline.

B, HCl: needles. Sol. H₂O.

B₂, H₂PtCl₆: cryst. Mod. sol. H₂O.

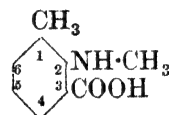
Winkelmann, *J. prakt. Chem.*, 1927, 115, 298.

4-Methylaminopyrimidone-2.

See *N*-Methyleytosine.

Methylaminosuccinic Acid.

See *N*-Methylaspartic Acid.

2-Methylamino-*m*-toluic AcidC₉H₁₁O₂N

MW, 165

Cryst. M.p. 149°. Alc. sol. shows blue fluor.

Houben, Freund, *Ber.*, 1913, 46, 3838.

4-Methylamino-*m*-toluic Acid.

Needles by sublimation or cryst. from pet. ether. M.p. about 128°. Alc. sol. shows blue fluor.

See previous reference.

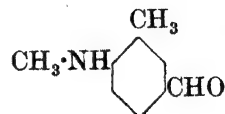
6-Methylamino-*m*-toluic Acid.

Needles from H₂O. M.p. 201°. Sol. most org. solvents.

Acetyl: cryst. M.p. 232°.

Houben, Schotmüller, Freund, *Ber.*, 1909, 42, 4490.

Meldrum, Advani, *J. Indian Chem. Soc.*, 1933, 10, 107.

6-Methylamino-*m*-toluic AldehydeC₉H₁₁ON

MW, 149

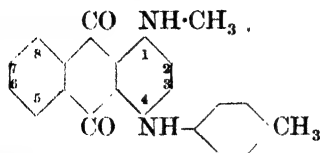
Plates or needles. M.p. 115°. Sol. EtOH, C₆H₆, AcOH. Spar. sol. H₂O, boiling ligroin.

Ullmann, Frey, *Ber.*, 1904, 37, 863.

Geigy, D.R.P., 103,578, (*Chem. Zentr.*, 1899, II, 927).

1-Methylamino-4-*p*-toluidinoanthraquinone

1-Methylamino-4-*p*-toluidinoanthraquinone



$C_{22}H_{18}O_2N_2$ MW, 342

Dark blue cryst. from MeOH. Sol. $CHCl_3$, Py. Less sol. EtOH. EtOH + HCl \rightarrow bluish-red sol. Conc. HCl \rightarrow reddish-violet sol. Conc. H_2SO_4 \rightarrow greenish-blue sol.

Bayer, D.R.P., 165,139, (*Chem. Zentr.*, 1905, II, 1762).

B.D.C., E.P., 271,602, (*Chem. Abstracts*, 1928, 22, 1595).

1-Methylamino-5-*p*-toluidinoanthraquinone.

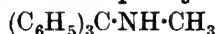
Needles from Py-MeOH. M.p. 199°. Sol. $CHCl_3$ with bluish-red col. Conc. H_2SO_4 \rightarrow yellow sol: + boric acid \rightarrow violet. Insol. conc. HCl.

Bayer, D.R.P., 139,581, (*Chem. Zentr.*, 1903, I, 679).

Methyl *p*-amino-*o*-tolyl sulphide.

See under 4-Amino-*o*-thiocresol.

α -Methylaminotriphenylmethane



$C_{20}H_{19}N$ MW, 273

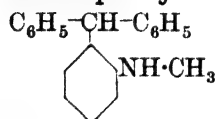
Prisms from ligroin. M.p. 73°. Sol. org. solvents. Insol. H_2O .

B, HCl: cryst. M.p. 216°. Sol. EtOH. Spar. sol. H_2O .

Hemilian, Silberstein, *Ber.*, 1884, 17, 745.

Vasborgh, *J. Am. Chem. Soc.*, 1916, 38, 2090.

2-Methylaminotriphenylmethane



$C_{20}H_{19}N$ MW, 273

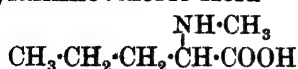
Rhomboheda from C_6H_6 . M.p. 130-2°. Sol. C_6H_6 . Spar. sol. EtOH, Et₂O.

B, HCl: prisms. M.p. above 210° decomp.

Acetyl: prisms from AcOEt. M.p. 147-5-148-5°.

Baeyer, Villiger, *Ber.*, 1904, 37, 3207.

1-Methylaminovaleric Acid



$C_6H_{13}O_2N$ MW, 131

3-Methyl-*n*-amyl Alcohol

Cryst. from EtOH or MeOH. Sublimes at 252°. Sol. H_2O . Spar. sol. cold EtOH. Aq. sol. has sweet taste.

Friedmann, *Beiträge zur Chemischen Physiologie und Pathologie*, 1908, 11, 170.

4-Methylaminovaleric Acid



$C_6H_{13}O_2N$ MW, 131

Needles or prisms from EtOH-Et₂O. M.p. 126-7° (121-2°). Hygroscopic. At 130-60° \rightarrow *N*-methyl- α -piperidone.

K salt: cryst. M.p. 280°.

B, HCl: cryst. M.p. 93°.

Et ester: $C_8H_{17}O_2N$. MW, 159. *B, HCl*: cryst. from AcOEt. M.p. 108-9°.

Picrate: cryst. + H_2O . M.p. 70-1°.

Ruzicka, *Helv. Chim. Acta*, 1921, 4, 474.

Prill, McElvain, *J. Am. Chem. Soc.*, 1933, 55, 1238.

Methylamylacetic Acid.

See 1-Methyl-*n*-heptylic Acid.

Methyl-*n*-amylacetylene.

See 2-Octine.

1-Methyl-*n*-amyl Alcohol.

See Methyl-*n*-butylcarbinol.

2-Methyl-*n*-amyl Alcohol (2-Methylpentanol-1)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot CH_2 \cdot OH$
 $C_6H_{14}O$ MW, 102

B.p. 148°/762 mm., 146-7°/749 mm. D^{20}_D 0.8396, D^{20}_4 0.8263. n^{20}_D 1.4182. KOH at 240-50° \rightarrow 1-methylvaleric acid.

Bouveault, Blanc, D.R.P., 164,294, (*Chem. Zentr.*, 1905, II, 1700).

Skita, *Ber.*, 1915, 48, 1492.

Wood, Scarf, *J. Soc. Chem. Ind.*, 1923, 42, 13T.

3-Methyl-*n*-amyl Alcohol (3-Methylpentanol-1)

$CH_3 \cdot CH_2 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot CH_2 \cdot CH_2 \cdot OH$
 $C_6H_{14}O$ MW, 102

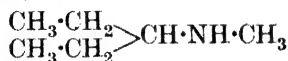
d-. B.p. 151-152.1°, 72°/25 mm. D^{15}_D 0.8295, D^{20}_D 0.8262, D^{20}_4 0.822. n^{25}_D 1.4182. $[\alpha]^{20}_D + 8.77^\circ$, $[\alpha]^{27}_D + 3.62^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1931, 91, 77.

Bowden, Adkins, *J. Am. Chem. Soc.*, 1934, 56, 689.

4-Methyl-*n*-amyl Alcohol.

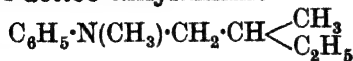
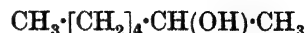
See Isohexyl Alcohol.

N-Methyl-*n*-amylamine (1-Methylamino-pentane) $\text{C}_6\text{H}_{15}\text{N}$ MW, 101Oil. B.p. 116–18°, 114°/745 mm. D_4^{15} 0.738.*B, HCl*: needles. M.p. 181–2°.*B, H₂PtCl₆*: yellow needles. M.p. 171–3°.*Picrate*: cryst. M.p. 121°.v. Braun, *Ann.*, 1911, **382**, 21.Löffler, *Ber.*, 1910, **43**, 2040.**N-Methyl-*sec.*-*n*-amylamine** (3-Methylaminopentane) $\text{C}_6\text{H}_{15}\text{N}$ MW, 101

B.p. 106–7°.

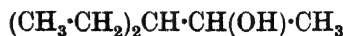
Acid oxalate: m.p. 142–3°.Skita, Keil, Havemann, *Ber.*, 1933, **66**, 1410.**2-Methyl-*n*-amylamine** (1-Amino-2-methylpentane) $\text{C}_6\text{H}_{15}\text{N}$ MW, 101*d.*B.p. 64°/90 mm., 28–30°/4 mm. D_4^{25} 0.763. $[\alpha]_D^{25} + 3.84^\circ$.*B, HCl*: cryst. $[\alpha]_D^{25} + 1.51^\circ$ in 50% EtOH.Levene, Marker, *J. Biol. Chem.*, 1932, **98**, 1.**3-Methyl-*n*-amylamine** (1-Amino-3-methylpentane) $\text{C}_6\text{H}_{15}\text{N}$ MW, 101*d.*B.p. 120–4°, 67°/100 mm. D_4^{26} 0.767. n_D^{25} 1.4196. $[\alpha]_D^{26} + 4.27^\circ$.Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.**4-Methyl-*n*-amylamine.**

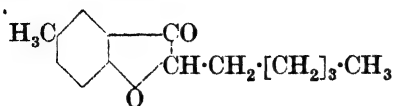
See Isohexylamine.

Methyl-active-amylaniline $\text{C}_{12}\text{H}_{19}\text{N}$ MW, 177B.p. 244–5°/764 mm., 131–2°/16 mm. D_4^{15} 0.9220. n_D^{15} 1.5313. $[\alpha]_D^{15} + 10.8^\circ$.*B, HCl*: cryst. M.p. 138°.Jones, *J. Chem. Soc.*, 1905, **87**, 138.**Methyl-*n*-amylcarbinol** (Heptanol-2, 2-hydroxyheptane) $\text{C}_7\text{H}_{16}\text{O}$ MW, 116*d.*B.p. 73.5°/20 mm. D_4^{20} 0.8190, D_4^{35} 0.8050. n_D^{20} 1.4209. $[\alpha]_D^{20} + 11.45^\circ$ in EtOH, $+ 13.71^\circ$ in C_6H_6 .*Acetyl*: b.p. 71°/17 mm. D_4^{15} 0.8650. n_D^{20} 1.4089. $[\alpha]_D^{20} + 8.23^\circ$.*Propionyl*: b.p. 82°/16 mm. D_4^{20} 0.8601. n_D^{20} 1.4133. $[\alpha]_D^{20} + 8.37^\circ$.*Butyryl*: b.p. 98°/17 mm. D_4^{17} 0.8600. n_D^{20} 1.4160. $[\alpha]_D^{20} + 10.16^\circ$.*Valeryl*: b.p. 116°/18 mm. D_4^{16} 0.8579. n_D^{20} 1.4199. $[\alpha]_D^{20} + 10.26^\circ$.*Caproyl*: b.p. 126°/15 mm. D_4^{20} 0.8541. n_D^{20} 1.4233. $[\alpha]_D^{20} + 9.97^\circ$.*Lauryl*: b.p. 174°/5 mm. D_4^{17} 0.8545. n_D^{20} 1.4376. $[\alpha]_D^{20} + 7.58^\circ$.*Myristyl*: b.p. 197°/4 mm. D_4^{17} 0.8562. n_D^{20} 1.4416. $[\alpha]_D^{20} + 6.59^\circ$.*Palmityl*: cryst. M.p. 19°. B.p. 213°/9 mm. D_4^{21} 0.8544. n_D^{20} 1.4433. $[\alpha]_D^{20} + 6.53^\circ$.*Stearyl*: cryst. M.p. 29°. B.p. 228°/7 mm. D_4^{35} 0.8454. $[\alpha]_D^{20} + 6.06^\circ$.*Acid phthalate*: *brucine salt*, m.p. 137–8°. $[\alpha]_D + 4.42^\circ$. *Strychnine salt*: m.p. 203–4°. $[\alpha]_D - 18.89^\circ$.*l.*B.p. 74.5°/23 mm. D_4^{20} 0.8184. $[\alpha]_D^{17} - 10.48^\circ$.*Acid phthalate*: *cinchonidine salt*, m.p. 108–9°. $[\alpha]_D - 70.36^\circ$.*dl.*B.p. 158–60° (155–157.5°), 66.7°/16.5 mm. D_4^2 0.8315, D_4^3 0.8167. n_D^{20} 1.4210. Insol. H_2O .

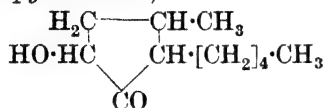
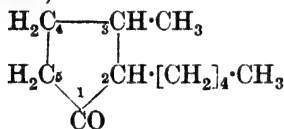
3 : 5-Dinitrobenzoyl: m.p. 49.4°.

1-Naphthylurethane: m.p. 54°.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 58; 1914, **105**, 830.Whitmore, Otterbacher, *Organic Syntheses*, 1930, **X**, 60.**Methyl-*sec.*-*n*-amylcarbinol** (3-Ethylpentanol-4, 3-ethyl-4-hydroxypentane, 1 : 1-diethylisopropyl alcohol) $\text{C}_7\text{H}_{16}\text{O}$ MW, 116B.p. 148–52°. D_4^0 0.8531. Ox. \rightarrow diethylacetone.Fourneau, Tiffeneau, *Compt. rend.*, 1907, **145**, 437.

4-Methyl-2-*n*-amylcoumaranoneC₁₄H₁₈O₂ MW, 218

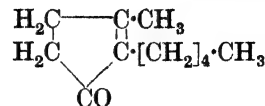
Yellow oil. B.p. 175°/18 mm.

Auwers, Wegener, *J. prakt. Chem.*, 1923, 106, 248.4-Methyl-3-*n*-amylcyclopentanolone-
(Tetrahydropyretrolone)C₁₁H₂₀O₂ MW, 184Oil. B.p. 160-2°/10 mm., 108-10°/0.1 mm., [α]_D²⁰ - 11.32°. Reduces NH₃, AgNO₃ and warm Fehling's.*Me ether*: C₁₂H₂₂O₂. MW, 198. Oil. B.p. 128°/12 mm.*Acetyl*: oil. B.p. 110°/0.16 mm.*Semicarbazone*: cryst. from CHCl₃. M.p. 189-90° decomp. Very sol. MeOH. Insol. C₆H₆.*p-Nitrophenylosazone*: cryst. from Py-C₆H₆. Decomp. at 350°.Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, 7, 225.3-Methyl-2-*n*-amylcyclopentanone (Tetrahydropyretrolone)C₁₁H₂₀O MW, 168

B.p. 100-1°/12 mm.

Semicarbazone: *l*-, cryst. from MeOH. M.p. 194°. *r*-, cryst. from C₆H₆. M.p. 159-60°.*p-Nitrophenylhydrazone*: *r*-, cryst. from EtOH. M.p. 87°.*Oxime*: oil. B.p. 100-2°/0.4 mm., 84-5°/0.1 mm.*Iso-oxime*: oil. B.p. 130-1°/0.8 mm., 120°/0.1 mm.Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, 7, 236, 245.4-Methyl-2-*n*-amylcyclopentanone.

B.p. 107-9°/14 mm.

Semicarbazone: cryst. M.p. 147-8°.*p-Nitrophenylhydrazone*: cryst. M.p. 134-5°.Ruzicka, Staudinger, *Helv. Chim. Acta*, 1924, 7, 248.3-Methyl-2-*n*-amyl-Δ²-cyclopentenoneC₁₁H₁₈O MW, 166

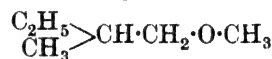
Oil. B.p. 115-17°/12 mm.

Semicarbazone: cryst. from C₆H₆. M.p. 175-6°.*p-Nitrophenylhydrazone*: cryst. from MeOH. M.p. 118-19°.Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, 7, 257.Methyl *n*-amyl Diketone.*See* Acetylcaproyl.Methyl *n*-amyl EtherC₆H₁₄O MW, 102

B.p. 99-100°/760 mm.

Lespieau, *Compt. rend.*, 1912, 154, 887.

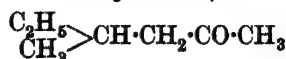
Methyl active-amyl Ether

C₆H₁₄O MW, 102B.p. 87.5-88.5°/731 mm. D₄¹⁸ 0.754. n_D²⁰ 1.3849. [α]_D¹⁸ + 0.61°.Guye, Chavanne, *Bull. soc. chim.*, 1896, 15, 300.Methyl-*n*-amylglyoxal.*See* Acetylcaproyl.Methyl-*n*-amylglyoxime.*See under* Acetylcaproyl.Methyl *n*-amyl Ketone (Heptanone-2, 2-keto-heptane)C₇H₁₄O MW, 114F.p. - 35.5°. B.p. 151-45°, 148-51°/750 mm., 111°/21 mm. D₄¹⁵ 0.83239, D₄¹⁵ 0.81966, D₄³⁰ 0.80680. n_D²⁰ 1.41433. Forms bisulphite comp.*Semicarbazone*: cryst. M.p. 120°.

2:4-Dinitrophenylhydrazone: yellowish-orange cryst. M.p. 89°.

Johnson, Hager, *Organic Syntheses*, Collective Volume I, 343.Methyl sec.-*n*-amyl Ketone.*See* 3-Ethylpentanone-2.

Methyl active-amyl Ketone (3-Methylhexanone-5, 5-keto-3-methylhexane)

C₇H₁₄O MW, 114

B.p. 146–7°, 139°/762 mm. Misc. with most org. solvents. Sol. conc. HCl, H₂SO₄, HNO₃. Forms bisulphite comp.

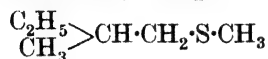
Kohler, *Am. Chem. J.*, 1907, **38**, 527.

Clarke, *J. Am. Chem. Soc.*, 1908, **30**, 1150.

Methylamylnonylcarbinol.

See 6-Methylpentadecanol-6.

Methyl active-amyl sulphide

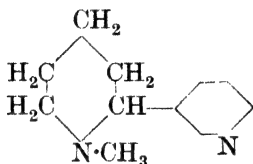


C₆H₁₄S MW, 118

B.p. 138–9°/751 mm. D₂₀¹⁹ 0.84. [α]_D¹⁹ +12.30°.

Brjuchonenko, *J. prakt. Chem.*, 1899, **59**, 46.

N-Methylanabasine



C₁₁H₁₆N₂ MW, 176

B.p. 268°/760 mm., 121°/7 mm. D₄²⁰ 1.0148. n_D¹⁵ 1.5328. [α]_D¹⁵ –85.1° (–84.34°).

B, HgCl₂: needles from H₂O. M.p. 129° decomp.

Picrate: cryst. from EtOH. M.p. 287–8° decomp.

Picrolonate: yellow needles from EtOH. M.p. 234–6° decomp.

Methiodide: yellow needles from EtOH. M.p. 245–7°. Sol. H₂O. Spar. sol. cold EtOH.

Orechoff, Norkina, *Ber.*, 1932, **65**, 726.

Methylanhydrochelidonine

C₂₁H₁₉O₄N MW, 349

Cryst. M.p. 152–3°. Optically inactive.

Methochloride: m.p. 215–17°.

Methiodide: cryst. M.p. 242–4°.

Methonitrate: m.p. 260–1°.

Gadamer, Dieterle, et al., *Arch. Pharm.*, 1924, **262**, 249.

Methylaniline



C₇H₉N MW, 107

F.p. –57°. B.p. 196.1° (193.8°)/760 mm., 156°/250 mm., 95°/25 mm., 79.2°/10 mm. D₄¹⁵ 0.9993, D₁₅¹⁵ 0.9879, D₄²⁰ 0.98912. n_D¹⁵ 1.57292, n_D²¹ 1.57021. Crit. temp. 428.6°. Insol. H₂O. k = 2.5 × 10^{–10} at 18°.

B, HCl: needles from CHCl₃–Et₂O. M.p.

121–2°. Very sol. CHCl₃. Sol. EtOH. Insol. Et₂O, C₆H₆.

B, HBr: needles. M.p. 98–9°. Sol. H₂O. Insol. Et₂O. Hygroscopic.

B, HI: cryst. M.p. 124°.

B₂, H₂PtCl₆: orange cryst. from HCl.Aq. M.p. 199° decomp.

B₂, H₂PtBr₆: red cryst. M.p. 227–8°.

B₂, H₂SnCl₆: cryst. M.p. 251° decomp. Sol. H₂O.

Oxalate: m.p. 113°.

Acid tartrate: m.p. 192°.

Picrate: yellow cryst. from MeOH. M.p. 144.5°.

N-Acetyl: see N-Methylacetanilide.

N-Benzoyl: N-methylbenzanilide. Cryst. from ligroin. M.p. 63°. B.p. 331–2°. Sol. usual org. solvents. Insol. H₂O.

N-Nitro: see methylphenylnitramine.

N-Nitroso: methylphenylnitrosamine. M.p. 13°. B.p. 128–128.4°/19 mm., 120.9–121.5°/13 mm. D₄²⁰ 1.1240. n_D²⁰ 1.57688. B, HCl: pale yellow needles. Decomp. at 120–30°.

1-Naphthalenesulphonyl: cryst. M.p. 147°. 100 parts H₂O dissolve 1.65 parts at 15°.

2-Naphthalenesulphonyl: cryst. M.p. 213°.

Naphthalene-2:6-disulphonyl: cryst. M.p. 272°. 100 parts H₂O dissolve 3.2 parts at 20°.

Ullmann, *Ann.*, 1903, **327**, 110.

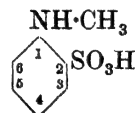
Wedekind, *Ber.*, 1899, **32**, 519.

Ullmann, *Enzyklopädie der technischen Chemie*, Vol. I [Berlin-Wien 1914], 443.

Frankland, Challenger, Nicholls, *J. Chem. Soc.*, 1919, **115**, 198.

Tsuipin, *Chem. Abstracts*, 1933, **27**, 4782.

Methylaniline-*o*-sulphonic Acid (N-Methylorphanilic acid)



C₇H₉O₃NS MW, 187

Decomp. at 182°. Salts are very sol. H₂O.

Amide: C₇H₁₀O₂N₂S. MW, 186. Needles from H₂O. M.p. 114.5–115.5°. N-Acetyl: prisms from EtOH. M.p. 174–7°.

Claasz, *Ann.*, 1911, **380**, 312.

Ekbom, *Bihang till Svenska Vet.-Akad. Handlingar*, **27**, II, No. 1, 4.

Methylaniline-*m*-sulphonic Acid (N-Methylmetanilic acid).

Needles from H₂O. Decomp. at 285–90°. 100 parts H₂O dissolve 7.63 parts at 15°. Insol.

Methylaniline-*p*-sulphonic Acid

EtOH. KOH fusion \rightarrow *m*-methylanilino-phenol.

Badische, D.R.P., 48,151.

Gnehm, Scheutz, *J. prakt. Chem.*, 1901, 63, 410.

Methylaniline-*p*-sulphonic Acid (N-Methylsulphanilic acid).

Plates from H₂O. M.p. 244–5° decomp. 100 parts H₂O dissolve 28.4 parts at 13°. Insol. EtOH. Violet-brown col. with FeCl₃.

Rosow, Döhle, Reim, *J. prakt. Chem.*, 1916, 93, 191.

Halberkann, *Ber.*, 1921, 54, 1836.

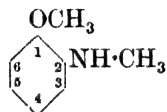
Methylanisaldehyde.

See under 5-Hydroxy-*o*-toluic Aldehyde and 6-Hydroxy-*m*-toluic Aldehyde.

Methylanisic Acid.

See under 5-Hydroxy-*o*-toluic Acid and 6-Hydroxy-*m*-toluic Acid.

N-Methyl-*o*-anisidine (*o*-Methylamino-anisole, *o*-methoxy-methylaniline)



C₈H₁₁ON

MW, 137

Cryst. M.p. 33–33.5°. B.p. 218–20°, 141–3°/46–7 mm. Sol. ord. org. solvents. Reduces NH₃.AgNO₃ and AuCl₃. Oxidising agents give brownish-red cols. HNO₂ \rightarrow yellow nitrosamine.

Picrate: yellow plates from EtOH. M.p. 139°.

Diepolder, *Ber.*, 1899, 32, 3515.

N-Methyl-*p*-anisidine (*p*-Methylamino-anisole, *p*-methoxy-methylaniline).

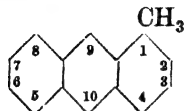
Cryst. from ligroin. M.p. 37°. B.p. 135–6°/19 mm., 111–13°/9 mm. Sol. most org. solvents. B₂H₂SnCl₆: plates. M.p. 91°.

Fröhlich, Wedekind, *Ber.*, 1907, 40, 1010.
Späth, Brunner, *Ber.*, 1925, 58, 522.

Methyl anisyl Ketone.

See Anisylacetone.

1-Methylanthracene



C₁₅H₁₂

MW, 192

Needles from MeOH. M.p. 85–6°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Alc. sol. shows blue fluor. Conc. H₂SO₄ \rightarrow yellowish-green sol.

624 2-Methylantracene-9(or 10)-carboxylic Acid

Irradiation \rightarrow dimethyldianthracene (m.p. 246°). CrO₃ in AcOH \rightarrow 1-methylantracenequinone.

Picrate: cryst. M.p. 113–15°.

Fischer, Sapper, *J. prakt. Chem.*, 1911, 83, 203.

Keimatsu, Hirano, Yoshimi, *Chem. Abstracts*, 1930, 24, 5037.

2-Methylantracene.

Plates by sublimation with greenish-blue fluor. M.p. 207° (199°). Very sol. C₆H₆, CHCl₃, CS₂. Spar. sol. EtOH, Et₂O, AcOH. Very spar. sol. MeOH, Me₂CO. Insol. H₂O. CrO₃ in AcOH \rightarrow 2-methylantracenequinone. Excess CrO₃ \rightarrow anthraquinone-2-carboxylic acid.

Fischer, *J. prakt. Chem.*, 1909, 79, 555.

Scholl, Lenko, *Monatsh.*, 1918, 39, 237.

General Aniline Works, U.S.P., 1,776,924, (*Chem. Abstracts*, 1930, 24, 5765).

9-Methylantracene (ms-Methylantracene).

Needles from 96% EtOH. M.p. 81.5° (79–80°). B.p. 196–7°/12 mm. Very sol. usual org. solvents. Conc. H₂SO₄ \rightarrow green sol.

Picrate: reddish-brown needles. M.p. 137° decomp.

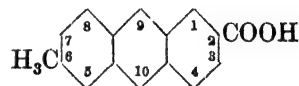
Sieglitz, Marx, *Ber.*, 1923, 56, 1620.

6-(or 7)Methylantracene-1-carboxylic Acid.

Golden yellow cryst. from EtOH or AcOH. M.p. 344°. Spar. sol. EtOH, AcOH. Sols fluoresce blue. Soda-lime at 400° \rightarrow 2-methylantracene.

Lavaux, *Ann. chim.*, 1910, 21, 136.

6-Methylantracene-2-carboxylic Acid (6-Methyl- β -anthroic acid)



C₁₆H₁₂O₂

MW, 236

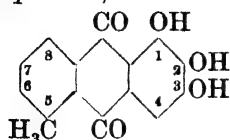
Yellow plates from AcOH. M.p. 347° Sol. AcOH. Spar. sol. EtOH. Sols fluoresce blue.

See previous reference and also Seer, *Monatsh.*, 1911, 32, 153.

2-Methylantracene-9(or 10)-carboxylic Acid.

Cryst. from C₆H₆. M.p. 197° decomp. Sol. most org. solvents. CrO₃ \rightarrow 2-methylantracenequinone.

Liebermann, *Ber.*, 1912, 45, 1214.

5-Methylanthragallol (5 : 6 : 7-Trihydroxy-1-methylanthraquinone) $C_{15}H_{10}O_5$

MW, 270

Cryst. M.p. 235–40°.

Triacetyl: m.p. 217–18°.

Liebermann, v. Kostanecki, Cahn, *Ann.*, 1887, **240**, 284.**6-Methylanthragallol (5 : 6 : 7-Trihydroxy-2-methylanthraquinone).**

Sublimes in orange-red needles. M.p. 275°.

See previous reference.

7-Methylanthragallol (6 : 7 : 8-Trihydroxy-2-methylanthraquinone).

Cryst. M.p. 312–13°.

Triacetyl: cryst. M.p. 188–90°.

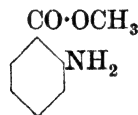
See previous reference.

8-Methylanthragallol (6 : 7 : 8-Trihydroxy-1-methylanthraquinone).

Yellow needles from EtOH. M.p. 297–8° decomp. Sol. hot H_2O , EtOH, AcOH. Spar. sol. C_6H_6 . Sublimes in red needles. Conc. H_2SO_4 → red sol. Conc. H_2SO_4 + trace HNO_3 → green sol. Conc. KOH → green sol. → violet on dilution. Hot NH_3 . Aq. → blue sol.

Triacetyl: yellow plates from AcOH. M.p. 208–10°. Sol. hot EtOH, Me_2CO , C_6H_6 , $CHCl_3$, AcOH.

See previous reference.

Methyl anthranilate $C_8H_9O_2N$

MW, 151

Occurs in Neroli, Ylang-Ylang, Bergamot, Jasmine and other essential oils and in grape juice. Cryst. M.p. 24–5°. B.p. 135.5°/15 mm., 126.2–126.8°/12 mm. Sol. EtOH, Et_2O . Spar. sol. H_2O . Alc. sols. show blue fluor. $D_4^{18.5}$ 1.16822. $k = 1.7 \times 10^{-12}$ at 25°. Volatile in steam. Used in perfumery as artificial orange blossom.

 B, HCl : needles. M.p. 181°. Sol. H_2O .

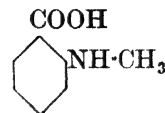
N -Formyl: needles from ligroin. M.p. 58°. Sol. H_2O , EtOH.

$C_8H_9O_2N$, $C_6H_5(NO_2)_3$ -1 : 3 : 5: orange-yellow needles from EtOH. M.p. 106°.

Diet. of Org. Comp.—II.

Picrate: yellow needles. M.p. 106°.

Erdmann, Erdmann, D.R.P., 110,386, (*Chem. Zentr.*, 1900, II, 461).

Meyer, *Monatsh.*, 1904, **25**, 1202.**N-Methylanthranilic Acid (o-Methylamino-benzoic acid)** $C_8H_9O_2N$

MW, 151

Plates from EtOH or ligroin. M.p. 182° (175°). Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Sol. 250 parts boiling H_2O . Amphoteric. $k_{(acid)} = 4.6 \times 10^{-6}$; $k_{(base)} = 9.4 \times 10^{-13}$ at 25°. Alkali salts show blue fluor. in aq. sol. Sublimes readily. Heat above m.p. → methylaniline. Sodamide + KOH fusion → indoxyl. KOH fusion in air → indigo.

B, HCl : needles. M.p. 141°. Sol. EtOH. Spar. sol. H_2O , Et_2O .

Me ester: $C_9H_{11}O_2N$. MW, 165. Constituent of mandarin oil. Cryst. from pet. ether. M.p. 19°. B.p. 256°/760 mm., 130–1°/15 mm. D_4^{15} 1.120, D_4^{23} 1.1348. $n_D^{13.3}$ 1.58395. $k = 3.36 \times 10^{-11}$ at 25°. B, HCl : needles from EtOH. M.p. 218°. Sol. H_2O . Insol. Et_2O .

Et ester: $C_{10}H_{13}O_2N$. MW, 179. M.p. 39°. B.p. about 270°, 172–5°/45 mm. Sol. Et_2O . Insol. H_2O .

Phenyl ester: $C_{14}H_{13}O_2N$. MW, 227. Yellow needles from EtOH. Aq. M.p. 70–1°. Sol. most org. solvents with strong blue fluor.

Amide: $C_8H_{10}ON_2$. MW, 150. Plates from EtOH. M.p. 159–60°. Sol. EtOH. Dil. sols show blue fluor.

Hydrazide: needles from C_6H_6 . M.p. 141–2°. Spar. sol. ligroin. C_6H_6 sol. shows blue fluor.

Acethydrazide: cryst. from C_6H_6 . M.p. 152°. Sol. EtOH, dil. acids.

Benzhydrazide: cryst. from EtOH. M.p. 192°. Spar. sol. C_6H_6 .

N -Acetyl: hydrazide, cryst. from EtOH. M.p. 234–5°. Sol. EtOH, dil. acids. Spar. sol. C_6H_6 , ligroin.

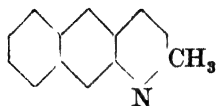
Vorländer, v. Schilling, Schrödter, *Ber.*, 1901, **34**, 1645.

Willstätter, Kahn, *Ber.*, 1904, **37**, 405.Houben, Brassert, *Ber.*, 1906, **39**, 3235.Houben, *Ber.*, 1909, **42**, 3194.

Heller, Göring, Kloss, Köhler, *J. prakt. Chem.*, 1925, **111**, 49.

Methylanthranol.

See Methylanthrone.

2-Methyl- α -anthrapyridine (2-Methyl-6:7-benzquinoline) $C_{14}H_{11}N$

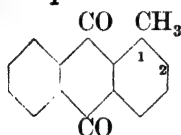
MW, 193

Plates from pet. ether. M.p. 129°. B.p. about 210° (in vacuo). Sol. EtOH, Et₂O, CHCl₃, AcOEt, CS₂. Less sol. pet. ether. Sols. show strong green or violet fluor. Sublimes.

B.HCl: needles. M.p. 200°.

Picrate: needles. M.p. 216°.

Lindner, Stauffer, *Monatsh.*, 1925, **46**, 239.

1-Methylantraquinone $C_{15}H_{10}O_2$

MW, 222

Yellow needles from EtOH or AcOH.Aq. M.p. 171–2°. Very sol. C₆H₆. Sol. AcOH, ligroin. Spar. sol. Et₂O. Turns red in air. HNO₃ at 160° → anthraquinone-1-carboxylic acid.

Fischer, Sapper, *J. prakt. Chem.*, 1911, **83**, 204.

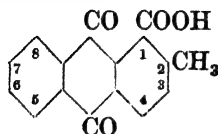
Scholl, Donat, *Ber.*, 1931, **64**, 320.

2-Methylantraquinone.

Needles from EtOH or AcOH. M.p. 177–9° (175°). Sol. EtOH, C₆H₆, AcOH. Less sol. Et₂O. Conc. H₂SO₄ → yellow sol. KOH + EtOH at 150–70° → anthraflavone. Zn dust → 2-methylanthrane. CrO₃ + dil. H₂SO₄ → anthraquinone-2-carboxylic acid. CrO₃ + AcOH + conc. H₂SO₄ + Ac₂O → anthraquinone-2-aldehyde.

The volatile constituent of teak-wood to which the name tectoquinone has been given has been found to be identical with 2-methylantraquinone (Kafuku, Sebe, *Bull. Chem. Soc. Japan*, 1932, **7**, 114).

Fieser, *Organic Syntheses*, Collective Vol. I, 345.

2-Methylantraquinone - 1 - carboxylic Acid $C_{16}H_{10}O_4$

MW, 266

Yellow cryst. from PhNO₂. M.p. 263–4°.

Me ester: C₁₇H₁₂O₄. MW, 280. Yellow needles from MeOH.Aq. M.p. 178–9°.

Et ester: C₁₈H₁₄O₄. MW, 294. Cryst. from AcOEt. M.p. 144°. Sol. EtOH, AcOEt. Spar. sol. C₆H₆.

Phenyl ester: C₂₂H₁₄O₄. MW, 342. Plates from AcOEt. M.p. 218–19°.

p-Bromophenyl ester: C₂₂H₁₃O₄Br. MW, 421. Plates from AcOEt. M.p. 226°.

Chloride: C₁₆H₉O₃Cl. MW, 284.5. Cryst. Decomp. about 192°.

Anhydride: C₃₂H₁₈O₇. MW, 514. Cryst. from Py. M.p. 268–5°.

Nitrile: C₁₆H₉O₂N. MW, 247. Yellow plates from AcOH.Aq. M.p. 268°.

Anilide: yellow cryst. from EtOH. M.p. 287–8°.

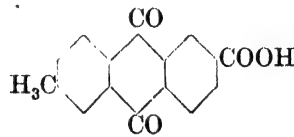
Scholl, Semp, Stix, *Ber.*, 1931, **64**, 71.

Scholl *et al.*, *Ber.*, 1928, **61**, 979; 1929, **62**, 107.

3-Methylantraquinone - 1 - carboxylic Acid.

Cryst. from EtOH or AcOH. M.p. 244–6°. KMnO₄ → anthraquinone-1:3-dicarboxylic acid.

Badische, D.R.P., 259,365, (*Chem. Zentr.*, 1913, I, 1741).

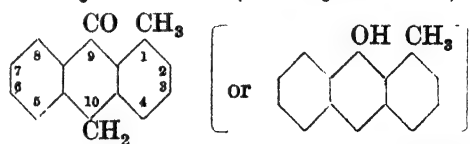
6-Methylantraquinone - 2 - carboxylic Acid $C_{16}H_{10}O_4$

MW, 266

Yellow needles from AcOH. M.p. 340°. Spar. sol. EtOH.

Lavaux, *Ann. chim.*, 1910, **21**, 139.

Seer, *Monatsh.*, 1911, **32**, 153.

1-Methylanthrone (1-Methylanthranol) $C_{15}H_{12}O$

MW, 208

Yellow cryst. from EtOH. M.p. 126–7°.

v. Braun, Bayer, *Ber.*, 1926, **59**, 914.

2-Methylanthrone (2-Methylanthranol).

Plates from MeOH. M.p. 103°. Very sol. Me₂CO, C₆H₆, AcOH. Sol. Et₂O, CCl₄. Ox. → 2-methylantraquinone.

Acetyl: cryst. from AcOH. M.p. 143°.

Me ether: $C_{16}H_{14}O$. MW, 222. Cryst. from MeOH. M.p. 77°.

Barnett, Goodway, *J. Chem. Soc.*, 1929, 1757.

3-Methylanthrone (3-Methylanthranol).

Yellow cryst. from C_6H_6 -pet. ether. M.p. 101°.

Acetyl: colourless cryst. from EtOH. M.p. 139°.

Barnett, Goodway, *J. Chem. Soc.*, 1929, 1758.

10-Methylanthrone (10-Methylanthranol, ms-methylanthrone).

Yellow needles from MeOH.Aq. M.p. 65°.

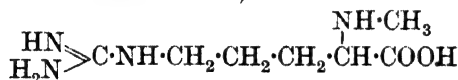
Acetyl: yellow needles from EtOH. M.p. 167°.

Barnett, Matthews, *Ber.*, 1926, 59, 768.

Methylarbutin.

See under Arbutin.

1-N-Methylarginine (1-Methylamino-4-guanidino-n-valeric acid)



$C_7H_{16}O_2N_4$ MW, 188

Pptd. from acid sol. by phosphotungstic acid.

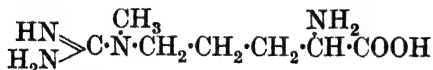
$B \cdot HNO_3$: m.p. 192°.

Flavianate: decomp. at 245–6°.

1-N-p-Toluenesulphonyl: decomp. at 268°.

Steib, *Z. physiol. Chem.*, 1926, 155, 286.

4-N-Methylarginine



$C_7H_{16}O_2N_4$ MW, 188

dl.

$B \cdot 2HCl$: needles from H_2O . Decomp. at 215°. Similar to arginine in behaviour toward alkaloidal reagents.

$B \cdot 2HNO_3$: plates or prisms from EtOH. M.p. 153°. Sol. H_2O , dil. HNO_3 .

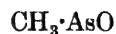
1-N-Benzoyl: needles from EtOH.Aq. M.p. 265° decomp.

Monopicrate: needles from H_2O . Decomp. at 207–9°.

Dipicrate: cryst. Decomp. at 168°.

Thomas, Kapfhammer, Flaschenträger, *Z. physiol. Chem.*, 1922, 124, 94.

Methylarsenious oxide



MW, 106

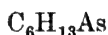
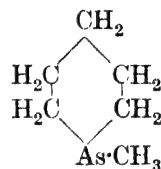
Cryst. from CS_2 . M.p. 95°. Decomp. on dist. Volatile in steam.

Palmer, Dehn, *Ber.*, 1901, 34, 3597.

1-Methylarsenidine.

See 1-Methylarsepidine.

1-Methylarsepidine (1-Methylarsenidine, methylpentamethylearsine)



MW, 160

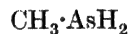
B.p. 156°/760 mm., 76°/36 mm., 65°/20–2 mm. D_{18}^{20} 1.218. Volatile in steam. Heat in sealed tube \rightarrow hydrocarbons + mirror of As. Inflammable vapour.

Chloroplatinate: yellow powder. M.p. 163°.

Methiodide: m.p. 290° decomp.

Zappi, *Bull. soc. chim.*, 1916, 19, 290.

Methylarsine (Arsinomethane)



MW, 92

B.p. 17°/1140 mm., 2°/760 mm. Sol. EtOH, Et_2O , CS_2 . Spar. sol. H_2O . Very poisonous. At 310° \rightarrow methane + H + arsine.

Zappi, *Bull. soc. chim.*, 1918, 23, 323.

Methylarsine dichloride.

See Methylchloroarsine.

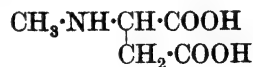
Methylarsine di-iodide.

See Methyl-di-iodoarsine.

C-Methylasparagine.

See Homoasparagine.

N-Methylaspartic Acid (Methylamino-succinic acid)



MW, 147

dl.

Cryst. + $1H_2O$ from H_2O . M.p. 133–4°, anhyd. 178°. 100 parts H_2O dissolve 2.59 parts at 21.2°. Reacts strongly acid.

Mono-Et ester: $C_7H_{13}O_4N$. MW, 175. Needles from EtOH. M.p. 181.5°.

Di-Et ester: $C_9H_{17}O_4N$. MW, 203. Oil. Spar. sol. H_2O .

Monoamide: $C_5H_{10}O_3N_2$. MW, 146. Needles + H_2O . Decomp. at 100° . Very sol. H_2O .

Monomethylamide: $C_6H_{12}O_3N_2$. MW, 160. Leaflets from EtOH.Aq. M.p. 291° .

Körner, Menozzi, *Gazz. chim. ital.*, 1889, 19, 428.

C-Methylaspartic Acid.

See Homoaspartic Acid.

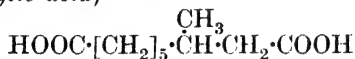
Methylatophan.

See Methyl-2-phenylquinoline-4-carboxylic Acid and 2-p-Tolylquinoline-4-carboxylic Acid.

β -Methylatropic Acid.

See 1-Phenylcrotonic Acid.

2-Methylazelaic Acid (2-Methylheptane-1:7-dicarboxylic acid)



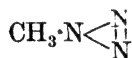
$C_{10}H_{18}O_4$ MW, 202

Cryst. M.p. $43-5^\circ$. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 .

Di-Et ester: $C_{14}H_{26}O_4$. MW, 258. B.p. $212-15^\circ/100$ mm.

Freer, Perkin, *J. Chem. Soc.*, 1888, 53, 218.

Methyl azide (Azidomethane, triazomethane)

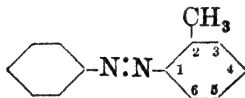


CH_3N_3 MW, 57

B.p. $20-1^\circ$. D_4^{20} 0.869. Explodes above 500° .

Dimroth, Wislicenus, *Ber.*, 1905, 38, 1573.

2-Methylazobenzene (o-Benzeneazotoluene)



$C_{13}H_{12}N_2$ MW, 196

Red oil. Does not solidify at -13° . B.p. $185-3^\circ/28$ mm., $180-1^\circ/20$ mm. D_4^{21} 1.073.

Löb, D.R.P., 102,891, (*Chem. Zentr.*, 1899, II, 408).

Jacobson, Lischke, *Ber.*, 1895, 28, 2544.

3-Methylazobenzene (m-Benzeneazotoluene).

Orange-red cryst. M.p. $18-19^\circ$. B.p. $175^\circ/19$ mm. D_4^{20} 1.065.

Badische, D.R.P., 54,599.

Michaelis, Petou, *Ber.*, 1898, 31, 991.

4-Methylazobenzene (p-Benzeneazotoluene).

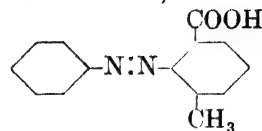
Orange-red plates from EtOH. M.p. $71-2^\circ$ ($66-7^\circ$). B.p. $311-13^\circ/760$ mm. Sol. Et_2O , C_6H_6 , $CHCl_3$, AcOEt, pet. ether. Less sol.

EtOH, AcOH. Sublimes at $80-90^\circ$. Volatile in steam. $Zn + NaOH \rightarrow$ 4-methylhydrazobenzene. $Fe + AcOH \rightarrow$ aniline + p-toluidine.

Mills, *J. Chem. Soc.*, 1895, 67, 930.

Jacobson, Lischke, Askenasy, *Ann.*, 1898, 303, 368.

6-Methylazobenzene-2-carboxylic Acid (2-Benzeneazo-m-toluic acid)

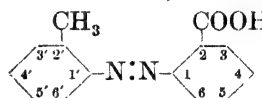


$C_{14}H_{12}O_2N_2$ MW, 240

Red plates + C_6H_6 from C_6H_6 -ligroin. M.p. 93° .

Freundler, *Bull. soc. chim.*, 1907, 1, 223.

2'-Methylazobenzene-2-carboxylic Acid (o-Tolueneazo-o-benzoic acid)



$C_{14}H_{12}O_2N_2$ MW, 240

Orange-red needles with blue lustre from toluene. M.p. 148° . $NaOH + Zn$ dust at $40^\circ \rightarrow$ 2'-methylhydrazobenzene-2-carboxylic acid.

Chemische Fabrik Weiler ter Meer, D.R.P. 145,063, (*Chem. Zentr.*, 1903, II, 973).

4'-Methylazobenzene-2-carboxylic Acid (p-Tolueneazo-o-benzoic acid).

Red needles from EtOH.Aq. M.p. 115° . Spar. sol. ligroin. Zn dust in EtOH + AcOH or NH_3 .Aq. \rightarrow 4'-methylhydrazobenzene-2-carboxylic acid.

Freundler, Sevestre, *Compt. rend.*, 1908, 147, 982.

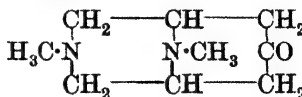
4'-Methylazobenzene-3-carboxylic Acid (p-Tolueneazo-o-benzoic acid).

Yellow plates or orange cryst. from EtOH. M.p. 192° . Sol. EtOH, Et_2O .

Löb, *Ber.*, 1898, 31, 2204.

Alway, *Ber.*, 1904, 37, 335.

N-Methylaztropinone



$C_9H_{16}ON_2$ MW, 168

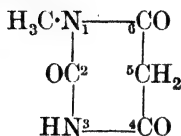
Oil.

Dipicrate: yellow needles from H_2O . M.p. 198° decomp.

Dipiperonylidene deriv.: orange-brown cryst. from isoamyl alcohol. M.p. 214°. Conc. H₂SO₄ → blue sol.

Blount, Robinson, *J. Chem. Soc.*, 1932, 2487.

1-Methylbarbituric Acid



C₅H₆O₃N₂

MW, 142

Plates from EtOH. M.p. 132°. Sol. hot H₂O, MeOH, EtOH, AcOH, CHCl₃. Spar. sol. cold H₂O, C₆H₆. Insol. Et₂O, ligroin.

Biltz, Hamburger, *Ber.*, 1916, 49, 648.

5-Methylbarbituric Acid.

Exists in two stereoisomeric forms.

α-

M.p. 207°.

Brucine salt: m.p. 220°.

β-

M.p. 197°.

Brucine salt: m.p. anhyd. 202°.

Nishikawa, *Chem. Abstracts*, 1931, 25, 5390.

N-Methylbenzanilide.

See under Methylaniline.

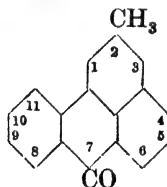
Methylbenzanthracene.

See Methylnaphthanthracene.

Methylbenzanthraquinone.

See Methylnaphthanthraquinone.

2-Methylbenzanthrone (See formulæ under Benzanthrone for alternative numbering)



C₁₈H₁₂O

MW, 244

Yellow needles from EtOH or Me₂CO. M.p. 171°. Ox. → anthraquinone-1-carboxylic acid.

Lüttringhaus, Grosskinsky, D.R.P., 482,839, (*Chem. Zentr.*, 1930, I, 3242).

4-Methylbenzanthrone.

Yellow needles from EtOH. M.p. 199°.

Mayer, Fleckstein, Günther, *Ber.*, 1930, 63, 1464.

Badische, D.R.P., 200,335, (*Chem. Zentr.*, 1908, II, 655).

8-Methylbenzanthrone.

Yellow needles from AcOEt. M.p. 167-8°. Sol. CHCl₃, C₆H₆. Spar. sol. AcOEt. Insol. EtOH, Et₂O. Sol. conc. H₂SO₄ to red sol.

Scholl, Seer, *Ann.*, 1912, 394, 145.

9-Methylbenzanthrone.

Yellow needles from hot EtOH. M.p. 170°. Spar. sol. EtOH, AcOEt, hot toluene. Sol. conc. H₂SO₄ to red fluor. sol.

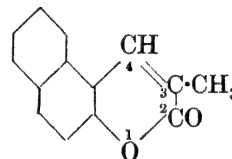
Scholl, Seer, *Ann.*, 1912, 394, 147.

10-Methylbenzanthrone.

Yellow needles from Me₂CO. M.p. 158-9°.

Scholl, Seer, *Ann.*, 1912, 394, 148.

3-Methyl-5':6'-benzcoumarin



C₁₄H₁₀O₂

MW, 210

Needles from EtOH. M.p. 157°.

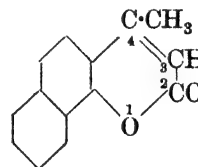
Bartsch, *Ber.*, 1903, 36, 1969.

4-Methyl-5':6'-benzcoumarin.

Needles from EtOH. M.p. 182-3°.

Bacovescu, *Ber.*, 1910, 43, 1280.

4-Methyl-7':8'-benzcoumarin



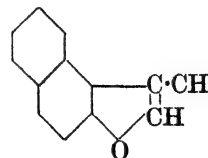
C₁₄H₁₀O₂

MW, 210

Needles from EtOH. M.p. 167°. Sol. EtOH, Et₂O, CHCl₃.

Bartsch, *Ber.*, 1903, 36, 1967.

3-Methyl-4':5'-benzcoumarone (3-Methyl-β-naphthafuran)



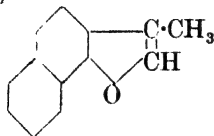
C₁₃H₁₀O

MW, 182

Plates from EtOH. M.p. 59°.

Picrate: needles. M.p. 156°.

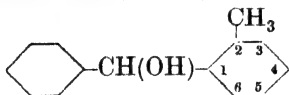
Stoermer, *Ann.*, 1900, 312, 312.

3-Methyl-6' : 7'-benzcoumarone (3-Methyl- α -naphthafuran) $C_{13}H_{10}O$

MW, 182

Cryst. M.p. 38°. B.p. 302-4°/720 mm. Very sol. most org. solvents. Volatile in steam.

v. Kostanecki, Tambor, *Ber.*, 1909, **42**, 908.

2-Methylbenzhydrol (α -Hydroxy-2-methyl-diphenylmethane phenyl-o-tolylcarbinol) $C_{14}H_{14}O$

MW, 198

Prisms from ligroin. M.p. 95° (91°). B.p. 323°. Sol. EtOH, Et₂O, C₆H₆. Red sol. in conc. H₂SO₄.

Cohen, *Rec. trav. chim.*, 1919, **38**, 118.

Tschitschibabin, *J. Russ. Phys.-Chem. Soc.*, 1909, **41**, 1117.

3-Methylbenzhydrol (α -Hydroxy-3-methyl-diphenylmethane, phenyl-m-tolylcarbinol).

Needles from pet. ether. M.p. 61° (43°). Sol. EtOH.

Montagne, v. Charante, *Rec. trav. chim.*, 1912, **31**, 348.

Cohen, *Rec. trav. chim.*, 1919, **38**, 118.

4-Methylbenzhydrol (α -Hydroxy-4-methyl-diphenylmethane, phenyl-p-tolylcarbinol).

Needles from ligroin. M.p. 58° (42°).

Fischer, Fischer, *Ann.*, 1878, **194**, 265.

Elbs, Brand, *Z. Electrochem.*, 1902, **8**, 785.

Cohen, *Rec. trav. chim.*, 1919, **38**, 118.

Marshall, *J. Chem. Soc.*, 1915, **107**, 516.

Methylbenzhydramine.

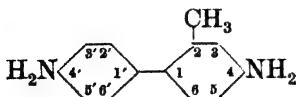
See α -Methylaminodiphenylmethane.

α -Methylbenzhydramine.

See 1-Hydroxy-2 : 2-diphenylpropane.

Methyl benzhydryl Ketone.

See unsym.-Diphenylacetone.

2-Methylbenzidine (4 : 4'-Diamino-2-methyl-diphenyl) $C_{13}H_{14}N_2$

MW, 198

Amorphous. Very sol. MeOH, Et₂O, C₆H₆. Sol. EtOH, ligroin.

N : N'-Dibenzylidene : needles from ligroin. M.p. 111-12°.

N : N'-Diacetyl : plates from AcOH. M.p. above 300°.

N : N'-Disalicyloyl : needles from ligroin. M.p. 160-5° after sintering at 155°.

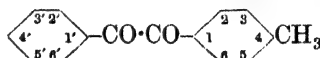
Jacobson, Nanninga, *Ber.*, 1895, **28**, 2549.

3-Methylbenzidine (4 : 4'-Diamino-3-methyl-diphenyl).

Amorphous. B.p. 225°/4 mm.

Picrate : yellow solid. M.p. 204°.

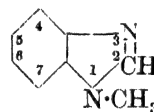
Braun, Mintz, *Ber.*, 1917, **50**, 1653.

4-Methylbenzil (Phenyl p-tolyl diketone) $C_{15}H_{12}O_2$

MW, 224

Cryst. from EtOH. M.p. 99-101°. Distills unchanged in high vacuum. Volatile in steam. KOH at 150° \rightarrow phenyl-p-tolylglycollic acid.

Weiss, *Monatsh.*, 1920, **40**, 396.

1-Methylbenziminazole $C_8H_8N_2$

MW, 132

M.p. 66° (61°). B.p. 278°/730 mm. D₄²⁰ 1.1254.

Picrate : yellow needles from H₂O. M.p. 246-7°.

Skraup, *Ann.*, 1919, **419**, 72.

Fischer, *Ber.*, 1901, **34**, 939; 1905, **38**, 322.

2-Methylbenziminazole.

Needles from H₂O. M.p. 175-6°. Distills unchanged. Sol. H₂O, NaOH.Aq. Spar. sol. EtOH, Et₂O.

Acetyl : needles from C₆H₆-pet. ether. M.p. 85-6°.

Phillips, *J. Chem. Soc.*, 1928, 2395.

Bamberger, Berlé, *Ann.*, 1893, **273**, 327.

4-Methylbenziminazole (o-Toliminazole).

Needles from C₆H₆. M.p. 143°. Sol. H₂O, EtOH.

Hübner, Schüpphaus, *Ber.*, 1884, **17**, 777.

5-Methylbenziminazole (m-Toliminazole).

Cryst. from H₂O. M.p. 114°. KMnO₄ \rightarrow benziminazole-5-carboxylic acid.

Niementowski, *Ber.*, 1897, **30**, 3064.

Fischer, *Ber.*, 1889, **22**, 644.

Bamberger, Berlé, *Ann.*, 1893, **273**, 333.

Methyl benzoateC₈H₈O₂

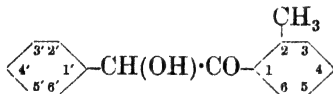
MW, 136

Colourless, pleasant-smelling liquid. M.p. — 12.3°. B.p. 199.6°. D_4^{20} 1.1035, D_4^{25} 1.0937, D_4^{192} 0.902, D_{15}^{25} 1.0942, D_{25}^{25} 1.0869. n_D^{20} 1.5116, n_D^{25} 1.5290, n_D^{20} 1.5399, n_D^{15} 1.5205. Heat of comb. C_p 943.97 Cal. Vap. press. at 60°, 3.9 mm.; at 70°, 6.8 mm.; at 80°, 11.5 mm.; at 100°, 29.2 mm.; at 130°, 96.3 mm.; at 150°, 190.5 mm.; at 170°, 351.5 mm.; at 190°, 625.9 mm. Insol. H₂O. Misc. with most org. solvents. PCl₅ at 160–80° → benzoyl chloride. H₃PO₄ at 200° → benzoic acid + dimethyl ether.

Carius, *Ann.*, 1859, **110**, 210.Graebe, *Ann.*, 1905, **340**, 246.**Methylbenzoic Acid.**

See Toluic Acid.

2-Methylbenzoin (o-Tolyl α-hydroxybenzyl ketone, β-hydroxy-α-keto-2-methyldiphenylethane)

C₁₅H₁₄O₂

MW, 226

Needles from MeOH.Aq. M.p. 108–9°. Sol. MeOH, Et₂O, C₆H₆, CCl₄. Reduces Fehling's.

McKenzie, Martin, Rule, *J. Chem. Soc.*, 1914, **105**, 1585.

4-Methylbenzoin (p-Tolyl α-hydroxybenzyl ketone, β-hydroxy-α-keto-4-methyldiphenylethane).

Needles from MeOH.Aq. M.p. 109°. Sol. MeOH, Et₂O, C₆H₆, CCl₄. Reduces Fehling's.

See above reference.

Methylbenzophenone.

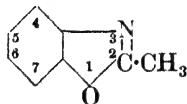
See Phenyl tolyl Ketone.

Methylbenzophenone-carboxylic Acid.

See Toluylbenzoic Acid.

Methylbenzoquinone.

See Toluquinone.

2-MethylbenzoxazoleC₈H₇ON

MW, 133

B.p. 200–1°. Very sol. EtOH. Insol. H₂O. D_4^0 1.1365.

Ladenburg, *Ber.*, 1876, **9**, 1525.Skraup, Moser, *Ber.*, 1922, **55**, 1080.**5-Methylbenzoxazole.**

Cryst. M.p. 45°.

Hofmann, Miller, *Ber.*, 1881, **14**, 572.**6-Methylbenzoxazole.**

Cryst. M.p. 38–9°. B.p. 200°.

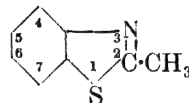
See previous reference.

Methylbenzoylcarbinol.

See β-Hydroxypropionophenone.

α-Methyl-β-benzoylstyrene.

See Dypnone.

2-Methylbenzthiazole (μ-Methylbenzthiazole)C₈H₇NS

MW, 149

B.p. 238°.

Ethiodide: needles from EtOH. M.p. 190–2°.

Methopicate: needles from EtOH–Et₂O. M.p. 94°.

Hydrogen sulphate: needles from EtOH–Et₂O. M.p. 177–8°.

Perchlorate: needles from EtOH–Et₂O. M.p. 149°.

Clark, *J. Chem. Soc.*, 1928, 2316.Mills, *J. Chem. Soc.*, 1922, **121**, 460.Hofmann, *Ber.*, 1880, **13**, 21, 1236.**4-Methylbenzthiazole.**

B.p. 252–3°.

Methiodide: needles from EtOH. M.p. 201–3°.

Rassow, Reim, *J. prakt. Chem.*, 1916, **93**, 221.

6-Methylbenzthiazole.

M.p. 15°. B.p. 255°. Volatile in steam.

Methiodide: leaflets from EtOH. M.p. 198–204°.

Ethiodide: m.p. 168°.

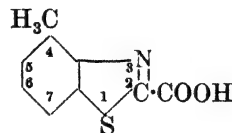
Picrate: m.p. 152–3°.

Zincke, Siebert, *Ber.*, 1915, **48**, 1251.

Mills, Brauholtz, *J. Chem. Soc.*, 1922, **121**, 1492.

Hess, *Ber.*, 1881, **14**, 492.

See also previous reference.

4-Methylbenzthiazole-2-carboxylic AcidC₉H₇O₂NS

MW, 193

Cryst. M.p. 110–11°.

Amide: C₉H₈ON₂S. MW, 192. Cryst. from EtOH. M.p. 163°.

Reissert, Brüggemann, *Ber.*, 1924, **57**, 989.

6-Methylbenzthiazole-2-carboxylic Acid.

Needles. M.p. 110–11° decomp.

Me ester: $C_{10}H_9O_2NS$. MW, 207. Needles from H_2O . M.p. 96°.*Amide*: cryst. from EtOH. M.p. 243°.

See previous reference.

1-Methylbenztriazole $C_7H_7N_3$ MW, 133Plates from C_6H_6 -ligroin. M.p. 64–5°. B.p. 270–1°. Very sol. hot H_2O , EtOH, C_6H_6 , AcOH. Less sol. Et_2O . Spar. sol. pet. ether.*Picrate*: yellow cryst. from H_2O . M.p. 149°.Reissert, *Ber.*, 1914, **47**, 675.**4-Methylbenztriazole** (*o*-Tolylazoimide, *o*-aziminotoluene).

B.p. 90.5°/31 mm.

Dutt, Whitehead, Wormall, *J. Chem. Soc.*, 1921, **119**, 2091.**5-Methylbenztriazole** (*m*-Tolylazoimide, *m*-aziminotoluene).

B.p. 92.5°/31 mm.

See previous reference.

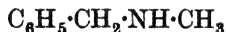
6-Methylbenztriazole (*p*-Tolylazoimide, *p*-aziminotoluene).

B.p. 93°/32 mm.

See previous reference.

Methylbenzyl Alcohol.

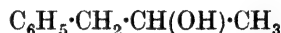
See Tylcarbinol and Methylphenylcarbinol.

N-Methylbenzylamine (ω -Methylamino-toluene) $C_8H_{11}N$ MW, 121Liq. with odour resembling benzylamine. B.p. 180–1. D_{15}^{20} 0.9450. Sol. H_2O .*B, HCl*: needles from EtOH- Et_2O . M.p. 175°.*B, HI*: cryst. from EtOH- Et_2O . M.p. 124°.*B, HAuCl₄*: cryst. from H_2O . M.p. 138°.*B₂H₂PtCl₆*: needles from H_2O . M.p. 197°. *Picrate*: yellow needles from EtOH. M.p. 117–118°.Emde, *Arch. Pharm.*, 1909, **247**, 364.McMeeking, Stevens, *J. Chem. Soc.*, 1933, **349**.**Methylbenzylamine.**

See Xylylamine.

N-Methylbenzylaniline (*Benzylmethylaniline*) $C_{14}H_{15}N$ MW, 197B.p. 305–6°, 210°/60 mm., 187–8°/26 mm., 161–2°/8 mm. D_{25}^{20} 1.0422. n_D^{30} 1.6008.*B, 2HCl*: m.p. 37°.*B, 2HI*: m.p. 25–6°.*Picrate*: needles from EtOH. M.p. 127°.Wedekind, *Ber.*, 1899, **32**, 519.Ephraim, Hochuli, *Ber.*, 1915, **48**, 630.Meisenheimer, Greeske, Willmersdorf, *Ber.*, 1922, **55**, 520.Desai, *Chem. Abstracts*, 1925, **19**, 2645.**Methylbenzyl bromide.**

See Xylyl bromide.

Methylbenzylcarbinol (2-Hydroxy-1-phenylpropane, 1-phenylisopropyl alcohol, β -hydroxypropylbenzene) $C_9H_{12}O$ MW, 136*d*-.
B.p. 125°/25 mm. D_4^{20} 1.0046, D_4^{20} 0.991, D_4^{42} 0.8812. n_D^{20} 1.5190. $[\alpha]_D^{20} + 16.13^\circ$ in EtOH. Volatile in steam.*Me ether*: $C_{10}H_{14}O$. MW, 150. B.p. 85°/12 mm. D_4^{25} 0.9314.*Et ether*: $C_{11}H_{16}O$. MW, 164. B.p. 93°/19 mm. D_4^{25} 0.9162.*Propyl ether*: $C_{12}H_{18}O$. MW, 178. B.p. 103°/13 mm. D_4^{25} 0.9093.*Butyl ether*: $C_{13}H_{20}O$. MW, 192. B.p. 115°/12 mm. D_4^{25} 0.8991.*n-Amyl ether*: $C_{14}H_{22}O$. MW, 206. B.p. 127°/14 mm. D_4^{25} 0.89.*Acetyl*: b.p. 115°/16 mm. $D_4^{17.5}$ 1.0058, D_4^{23} 0.9069. n_D^{20} 1.4897. $[\alpha]_D^{20} + 6.41^\circ$.*Propionyl*: b.p. 121°/15 mm. D_4^{20} 0.989, D_4^{28} 0.8897. $[\alpha]_D^{20} + 4.81^\circ$.*Butyryl*: b.p. 132°/16 mm. D_4^{20} 0.9749, D_4^{28} 0.8782. n_D^{20} 1.4825. $[\alpha]_D^{20} + 8.48^\circ$.*Valeryl*: b.p. 148°/16 mm. D_4^{21} 0.9630. n_D^{20} 1.4812. $[\alpha]_D^{20} + 10.76^\circ$.*Lauryl*: b.p. 183°/5 mm. D_4^{20} 0.9229. n_D^{20} 1.4772. $[\alpha]_D^{21} + 8.86^\circ$.*Palmityl*: m.p. 20.5°. B.p. 235°/6 mm. D_4^{19} 0.9131. n_D^{20} 1.4760. $[\alpha]_D^{22} + 7.66^\circ$.*Stearyl*: m.p. 28.5°. B.p. 215°/2 mm. D_4^{26} 0.9058. $[\alpha]_D^{26} + 7.0^\circ$.*l*-.
 $[\alpha]_D - 26.6^\circ$.

Semicarbazone: prisms from EtOH. M.p. 197–8°. Spar. sol. EtOH, Et₂O.

Apitzsch, *Ber.*, 1905, **38**, 2897.

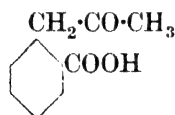
Senderens, *Compt. rend.*, 1910, **150**, 1338.

Tiffeneau, *Compt. rend.*, 1906, **142**, 1539.

Danilov, Venus-Danilova, *Ber.*, 1927, **60**, 1067.

Nober, Friedolsheim, *Ann.*, 1926, **449**, 121.

Methyl benzyl Ketone *o*-carboxylic Acid
(*o*-Acetonylbenzoic acid, methyl *o*-carboxybenzyl ketone)



C₁₀H₁₀O₃ MW, 178

Needles from C₆H₆-pet. ether. M.p. 118–19°. Sol. hot H₂O, EtOH, Et₂O, CHCl₃, C₆H₆.

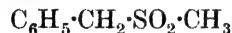
Oxime: leaflets from 50% EtOH. M.p. 162°. Spar. sol. EtOH, Et₂O.

Gottlieb, *Ber.*, 1899, **32**, 965.

Methyl benzyl sulphide.

See under Benzyl Mercaptan.

Methyl benzyl sulphone



C₈H₁₀O₂S MW, 170

Needles from H₂O. M.p. 127°.

Fromm, Palma, *Ber.*, 1906, **39**, 3315.

N-Methylbiuret.

See under Biuret.

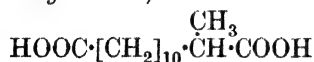
Methyl borate.

See Trimethyl borate.

2-Methylborneol.

See Homoborneol.

1-Methylbrassylic Acid (1-Methylundecane-1:11-dicarboxylic acid)



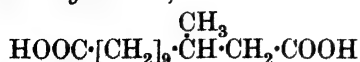
C₁₄H₂₆O₄ MW, 258

Cryst. from C₆H₆-pet. ether. M.p. 87·5–88·5°.

Di-Me ester: C₁₆H₃₀O₄. MW, 286. B.p. 185°/9 mm.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, **10**, 175.

2-Methylbrassylic Acid (2-Methylundecane-1:11-dicarboxylic acid)



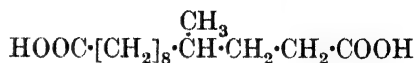
C₁₄H₂₆O₄ MW, 258

Cryst. from EtOH.Aq. or C₆H₆-pet. ether. M.p. 68·5–69·5°.

Di-Me ester: C₁₆H₃₀O₄. MW, 286. B.p. 182–5°/8 mm. D₁₅ 0·958.

See previous reference.

3-Methylbrassylic Acid (3-Methylundecane-1:11-dicarboxylic acid)



C₁₄H₂₆O₄ MW, 258

Cryst. from C₆H₆-pet. ether. M.p. 47°.

Ruzicka, Steiger, *Helv. Chim. Acta*, 1927, **10**, 689.

Methyl bromide (Bromomethane)



CH₃Br MW, 95

Colourless gas. B.p. 4·5°. Cryst. in liquid air. D₄ 1·732. Heat of comb. C_p 184·71 Cal. Latent heat at 20° 61·52 kg.-cal./kg. Used as a refrigerating agent and has no corrosive action. Vapour is poisonous.

Steinkopf, Frommel, *Ber.*, 1905, **38**, 1865.

Bygdén, *J. prakt. Chem.*, 1911, **83**, 421.

Hsia, *Chem. Abstracts*, 1931, **25**, 5221.

Methyl 4-bromobutyl Ketone (4-Acetobutyl bromide, 6-bromohexanone-2)

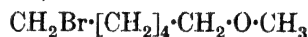


C₆H₁₁OBr MW, 179

B.p. 214–15°/720 mm., 155–60°/150 mm., 135–7°/90 mm. D₄ 1·3496. Sol. EtOH, Et₂O. Alkalis → allylacetone. Boiling H₂O → 1-hexanolone-5. Alc. NH₃ → tetrahydropicoline.

Lipp, *Ann.*, 1896, **289**, 195.

Methyl 6-bromohexyl Ether (6-Bromo-1-methoxyhexane)



C₇H₁₅OBr MW, 195

Liq. with faint fruity odour. B.p. 112°/35 mm. D₂₁ 1·194.

Dionneau, *Compt. rend.*, 1907, **145**, 128.

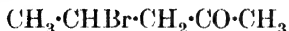
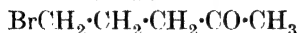
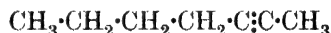
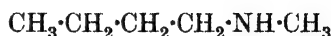
Methyl 2-bromoisobutyl Ketone (*Mesityl oxide hydrobromide*, 2-bromo-2-methylpentanone-4)



C₆H₁₁OBr NW, 179

B.p. 52–3°/11 mm. Darkens rapidly in air and on distillation at ord. press. finally yielding a resin.

Rupe, Kessler, *Ber.*, 1909, **42**, 4715.

Methyl *p*-bromophenyl sulphide.*See under p*-Bromothiophenol.**Methyl 3-bromopropyl Ether.***See under* 3-Bromopropyl Alcohol.**Methyl 2-bromopropyl Ketone (4-Bromopentanone-2)** $\text{C}_5\text{H}_9\text{OBr}$ MW, 165B.p. $62^\circ/20$ mm., $50\text{--}55^\circ/15$ mm. Hot $\text{KHCO}_3\cdot\text{Aq.} \rightarrow$ methyl propenyl ketone.Blaise, *Bull. soc. chim.*, 1905, **33**, 43.Wohl, Maag, *Ber.*, 1910, **43**, 3283.**Methyl 3-bromopropyl Ketone (5-Bromopentanone-2, 3-acetopropyl bromide)** $\text{C}_5\text{H}_9\text{OBr}$ MW, 165B.p. $188\text{--}90^\circ$ part. decomp., $106^\circ/60$ mm. Sol. Et_2O . Spar. sol. H_2O . Boiling $\text{H}_2\text{O} \rightarrow$ 3-acetopropyl alcohol. Alc. $\text{NH}_3 \rightarrow \alpha$ -methylpyrroline. Methylamine $\rightarrow N$ - α -dimethylpyrroline.Lipp, *Ber.*, 1889, **22**, 1206.Marshall, Perkin, *J. Chem. Soc.*, 1891, **59**, 860, 876.**Methyl- ψ -brucidine** $\text{C}_{24}\text{H}_{30}\text{O}_3\text{N}_2$ MW, 394Plates from EtOH . M.p. $198\text{--}9^\circ$. Sol. Me_2CO , C_6H_6 , AcOH . Insol. H_2O .*B*, 2*H* 1: plates from H_2O . M.p. 259° decomp.*Methiodide*: plates from MeOH . M.p. 297° decomp.Gulland, Perkin, Robinson, *J. Chem. Soc.*, 1927, 1651.**1-Methylbutadiene-1 : 3.***See* 1 : 3-Pentadiene.**2-Methylbutadiene-1 : 3.***See* Isoprene.**2-Methylbutadiene-2 : 3.***See unsym.*-Dimethylallene.**2-Methyl-1 : 3-butadiene-1 : 4-dicarboxylic Acid.***See* 2-Methylmuconic Acid.**2-Methylbutane.***See* Isopentane.**2-Methylbutane-1 : 1-dicarboxylic Acid.***See sec.*-Butylmalonic Acid.**2-Methylbutane-1 : 2-dicarboxylic Acid.***See* 1-Methyl-1-ethylsuccinic Acid.**2-Methylbutane-1 : 3-dicarboxylic Acid.**1 : 2-Dimethylglutaric Acid, *q.v.***2-Methylbutane-2 : 3-dicarboxylic Acid.***See* Trimethylsuccinic Acid.**3-Methylbutane-1 : 1-dicarboxylic Acid.***See* Isobutylmalonic Acid.**3-Methylbutane-1 : 2-dicarboxylic Acid.***See* Isopropylsuccinic Acid.**3-Methylbutane-1 : 3-dicarboxylic Acid.**1 : 1-Dimethylglutaric Acid, *q.v.***3-Methylbutane-2 : 2-dicarboxylic Acid.***See* Methylisopropylmalonic Acid.**Methylbutane-tricarboxylic Acid.***See* Isopentane-tricarboxylic Acid.**2-Methylbutanol-3.***See* Methylisopropylcarbinol.**2-Methylbutanone-3.***See* Methyl isopropyl Ketone.**Methylbutenine.***See* Isopropenylacetylene.**2-Methyl-1-butenol-3.***See* Methylisopropenylcarbinol.**Methyl- γ -butenylcarbinol.***See* 1-Hexenol-5.***sym.*-Methyl- α -butenyl-ethylene.***See* 2 : 4-Heptadiene.**2-[2-Methyl- β -butenyl]-guanidine.***See* Galegine.**Methyl α -butenyl Ketone.***See* 3-Hexenone-2.**Methyl β -butenyl Ketone.***See* 2-Hexenone-5.**Methyl- γ -butenyl Ketone.***Allylacetone, q.v.***3-Methylbutine-1.***See* Isopropylacetylene.**Methylbutylacetic Acid.***See* 1-Methylcaproic Acid.**Methylbutylacetylene (2-Heptene)** C_7H_{12} MW, 96B.p. $111\text{--}13^\circ/750$ mm. ($111.5\text{--}112.5^\circ$). D_4^{20} 0.7632, D_4^{21} 0.748. n_D^{21} 1.4208. Heat with H_2O at $325^\circ \rightarrow$ methyl *n*-amyl ketone + ethyl *n*-butyl ketone.Béhal, *Ann. chim.*, 1888, **15**, 427.Desgrez, *Ann. chim.*, 1894, **3**, 234.Gredy, *Compt. rend.*, 1933, **197**, 327.**Methylbutylallylcarbinol.***See* 4-Methyl-1-octenol-4.**Methyl-*n*-butylamine** $\text{C}_5\text{H}_{13}\text{N}$ MW, 87B.p. $90.5\text{--}91.5^\circ/764$ mm. D_4^{20} 0.7367, D_4^{21} 0.7363. n_D^{21} 1.40180.*B, HCl*: plates from Me_2CO . M.p. $170\text{--}1^\circ$. Sol. H_2O , EtOH , Me_2CO , CHCl_3 .

$B_2H_2PtCl_6$: yellow needles. M.p. 205–6° decomp. Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O .

Picrate: plates from EtOH. M.p. 111–12°. Spar. sol. H_2O . N-Nitroso: b.p. 198°.

Löffler, Freytag, *Ber.*, 1909, **42**, 3429.

Franchimont, van Erp, *Rec. trav. chim.*, 1895, **14**, 323.

Graymore, *J. Chem. Soc.*, 1932, 1355.

Methyl-sec.-n-butylamine

$CH_3 \cdot CH_2 \cdot \overset{\overset{CH_3}{|}}{CH} \cdot NH \cdot CH_3$
 $C_5H_{13}N$ MW, 87

dl-.

B.p. 78–9°. D_4^{18} 0.740.

$B \cdot H AuCl_4$: yellow needles. M.p. 58°.

$B_2H_2PtCl_6$: orange cryst. M.p. 151°.

Picrate: m.p. 78°.

Löffler, *Ber.*, 1910, **43**, 2041.

Methyl-tert.-butylamine

$(CH_3)_3C \cdot NH \cdot CH_3$
 $C_5H_{13}N$ MW, 87

B.p. 58–60° (54–6°).

Phenylurea: m.p. 118°.

Sabatier, Mailhe, *Bull. soc. chim.*, 1907, **1**, 615.

2-Methyl-n-butylamine (active-Amylamine)

$CH_3 \cdot CH_2 \cdot \overset{\overset{CH_3}{|}}{CH} \cdot CH_2 \cdot NH_2$
 $C_5H_{13}N$ MW, 87

dl-.

B.p. 95.5–96°. Sol. H_2O . D_4^{18} 0.7550, D_4^{25} 0.7505. $[\alpha]_D^{25}$ – 5.86°.

$B \cdot HCl$: m.p. 176°. Hygroscopic.

$B_2H_2PtCl_6$: yellow plates. Decomp. at 240°. Mod. sol. H_2O . Spar. sol. EtOH.

Marckwald, *Ber.*, 1904, **37**, 1048.

Ehrlich, *Ber.*, 1907, **40**, 2548.

Plimpton, *J. Chem. Soc.*, 1881, **39**, 334.

Methylbutylaniline

$C_6H_5 \cdot N \begin{cases} CH_3 \\ CH_2 \cdot [CH_2]_2 \cdot CH_3 \end{cases}$
 $C_{11}H_{17}N$ MW, 163

B.p. 240–244° (225–30°).

Picrate: yellow needles from EtOH. M.p. 141–2° (90°). Sol. C_6H_6 , hot EtOH.

Fröhlich, Wedekind, *Ber.*, 1907, **40**, 1648.

Komatsu, *Chem. Zentr.*, 1913, I, 799.

Methyl-n-butylcarbinol (1-Methyl-n-amyl alcohol, 2-hydroxyhexane, 1-methylpentanol-1, hexanol-2)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH(OH) \cdot CH_3$
 $C_6H_{14}O$ MW, 102

dl-.

B.p. 137–8°. D_4^{18} 0.8179. n_D^{20} 1.4135. $[\alpha]_D^{19}$ + 11.6°, $[\alpha]_D^{20}$ + 12.70° in EtOH (13.95° in C_6H_6).

Acetyl: $C_8H_{16}O_2$. MW, 144. B.p. 57°/20 mm. D_4^{18} 0.8658.

Propionyl: $C_9H_{18}O_2$. MW, 158. B.p. 76°/15 mm. D_4^{20} 0.8644. n_D^{20} 1.4081. $[\alpha]_D^{20}$ + 9.76°.

Butyryl: $C_{10}H_{20}O_2$. MW, 172. B.p. 85°/20 mm. D_4^{21} 0.8744.

Valeryl: $C_{11}H_{22}O_2$. MW, 186. B.p. 106°/21 mm. D_4^{14} 0.8606.

Caproyl: $C_{12}H_{24}O_2$. MW, 200. B.p. 116°/17 mm. D_4^{20} 0.8575. n_D^{20} 1.4202. $[\alpha]_D^{20}$ + 10.84°.

Palmityl: $C_{22}H_{44}O_2$. MW, 340. M.p. 21°. B.p. 179°/2 mm. D_4^{25} 0.8492. $[\alpha]_D^{20}$ + 6.87°.

Stearyl: $C_{24}H_{48}O_2$. MW, 368. M.p. 28°. B.p. 195°/3 mm. D_4^{21} 0.8514. $[\alpha]_D^{20}$ + 6.16°.

l-.

$[\alpha]_D^{25}$ – 1.75°.

1-Naphthylurethane: $[\alpha]_D^{25}$ – 4.28° in EtOH.

dl-.

B.p. 136° (138–9°/732 mm., 139.5°/745 mm.) D_4^0 0.8287, D_{20}^{20} 0.823. n_D^{18} 1.4190. $HNO_3 \rightarrow$ acetylbutyryl.

3:5-Dinitrobenzoyl: m.p. 38.5°.

1-Naphthylurethane: m.p. 60.5°.

Ponzio, *Gazz. chim. ital.*, 1901, **31**, 404.

Sabatier, Senderens, *Compt. rend.*, 1903, **137**, 302.

Brooks, Humphrey, *J. Am. Chem. Soc.*, 1918, **40**, 834.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 58.

Terentiev, *Bull. soc. chim.*, 1926, **39**, 46.

Lespieau, Lombard, *Bull. soc. chim.*, 1935, **2**, 373.

Methyl-sec.-n-butylcarbinol (2-Hydroxy-3-methylpentane, 3-methylpentanol-2)

$CH_3 \cdot CH_2 \cdot \overset{\overset{CH_3}{|}}{CH} \cdot CH(OH) \cdot CH_3$
 $C_6H_{14}O$ MW, 102

B.p. 134°. D_4^{18} 0.8307 (0.8037). n_D^{18} 1.4205.

Wislicenus, *Ann.*, 1883, **219**, 309.

Methyl-tert.-butylcarbinol (*Pinacolin alcohol*, 3-hydroxy-2:2-dimethylbutane, 3:3-dimethylbutanol-2)

$(CH_3)_3C \cdot CH(OH) \cdot CH_3$
 $C_6H_{14}O$ MW, 102

1-Methyl-4-tert.-butylcyclohexanone-3 637 2-Methyl-2-butylene-1-carboxylic Acid

d.

B.p. 120°/760 mm. D_4^{16} 0.8219, D_4^{25} 0.810, D_4^{33} 0.8075, D_4^{47} 0.7918. n_D^{20} 1.4146. $[\alpha]_D^{20} + 7.71^\circ$.

Acetyl: b.p. 141°/756 mm. D_4^{25} 0.856. n_D^{25} 1.4001. $[\alpha]_D^{25} + 9.63^\circ$.

Benzoyl: b.p. 105–105.5°/5 mm. D_4^{25} 0.970; n_D^{25} 1.4882. $[\alpha]_D^{25} + 27.92^\circ$.

dl.

M.p. 5.6° (4°). B.p. 121° (120–120.6°/760 mm.). D_4^0 0.8347, D_4^{20} 0.8185, D_4^{25} 0.8122. Spar. sol. H_2O . Heat of comb. C_v 947.3 Cal., C_p 949.0 Cal. $CrO_3 \rightarrow$ pinacolin + pivalic acid.

Acetyl: b.p. 141.2–141.4°/740 mm.

Phenylurethane: m.p. 79°.

Delacre, *Chem. Zentr.*, 1906, I, 1234.

Richard, *Ann. chim.*, 1910, 21, 346.

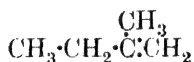
Pickard, Kenyon, *J. Chem. Soc.*, 1914, 105, 1120.

Stevens, *J. Am. Chem. Soc.*, 1933, 55, 4239.

1-Methyl-4-tert.-butylcyclohexanone-3.

See Homomenthone.

2-Methylbutylene-1 (γ -Amylene, unsym.-methylethylethylene)



C_5H_{10}

MW, 70

B.p. 32°/758 mm. D_4^0 0.6668. n_D^{15} 1.378. $HCl.Aq. \rightarrow$ 2-chloroisopentane. $HBr.Aq. \rightarrow$ 2-bromoisopentane.

Le Bel, *Bull. soc. chim.*, 1876, 25, 546.

Michael, Zeidler, *Ann.*, 1911, 385, 251.

Leendertse, Tulleners, Waterman, *Rec. trav. chim.*, 1933, 52, 520.

3-Methylbutylene-1 (Isopropylethylene, α -iso-amylene, isopentene-1, 2-vinylpropane)



C_5H_{10}

MW, 70

B.p. 20.1°/760 mm. D_4^0 0.648, D_4^{15} 0.63197 (0.6338). n_D^{15} 1.3675. $HCl.Aq. \rightarrow$ 3-chloroisopentane. HCl in $AcOH \rightarrow$ 50% 3-chloroisopentane + 50% 4-chloroisopentane. $HBr.Aq. \rightarrow$ 3-bromoisopentane. Heat \rightarrow 2-methylbutylene-2.

Ipatiev, *Chem. Zentr.*, 1901, I, 1195.

Michael, Zeidler, *Ann.*, 1911, 385, 250.

Norris, Reuter, *J. Am. Chem. Soc.*, 1927, 49, 2629.

Leendertse, Tulleners, Waterman, *Rec. trav. chim.*, 1933, 52, 517.

2-Methylbutylene-2 (Isopentene-2, β -iso-amylene, trimethylethylene, isopropylidene-ethane, 2-ethylidenepropene)



C_5H_{10}

MW, 70

B.p. 38.42° (37.2°)/760 mm. D_4^0 0.6783, D_4^{15} 0.66708, D_4^{25} 0.65694. n_D^{15} 1.3908. $KMnO_4 \rightarrow$ trimethylethylene glycol + $CH_3 \cdot CO \cdot CH_3$ + $CH_3 \cdot COOH$ + $CH_3 \cdot CHO$. $HBr.Aq. \rightarrow$ 2-bromoisopentane. $HOCl \rightarrow$ 3-chloro-2-hydroxyisopentane.

Kahlbaum, *D.R.P.*, 66,866.

Ipatiev, Huhn, *Ber.*, 1903, 36, 2015.

Michael, Zeidler, *Ann.*, 1911, 385, 251.

Kyriakides, *J. Am. Chem. Soc.*, 1914, 36, 1002.

Hibbert, *J. Am. Chem. Soc.*, 1915, 37, 1753.

Norris, Reuter, *J. Am. Chem. Soc.*, 1927, 49, 2630.

Whitmore, Stahly, *J. Am. Chem. Soc.*, 1933, 55, 4156.

I.G., *D.R.P.*, 565,160, (*Chem. Abstracts*, 1933, 27, 992).

1-Methyl-1-butylene-1-carboxylic Acid.

See 1-Methyl-2-ethylacrylic Acid.

2-Methyl-1-butylene-1-carboxylic Acid.

See 2-Methyl-2-ethylacrylic Acid.

3-Methyl-1-butylene-1-carboxylic Acid.

See 2-Isopropylacrylic Acid.

3-Methyl-1-butylene-2-carboxylic Acid.

See 1-Isopropylacrylic Acid.

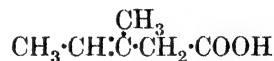
3-Methyl-1-butylene-3-carboxylic Acid.

Dimethylvinylacetic Acid, *q.v.*

1-Methyl-2-butylene-1-carboxylic Acid.

See 1-Methyl-2-ethylidenepropionic Acid.

2-Methyl-2-butylene-1-carboxylic Acid (2-Methyl-2-pentenoic acid, 2-ethylidenebutiric acid)



$C_6H_{10}O_2$

MW, 114

Oil. B.p. 199°, 116°/23 mm., 96°/10 mm. $D_4^{25.2}$ 0.97845. $n_D^{25.2}$ 1.44692. $k = 2.88 \times 10^{-5}$ at 25°.

Et ester: $C_8H_{14}O_2$. MW, 142. B.p. 62°/13 mm. $D_4^{18.8}$ 0.91633. $n_D^{18.8}$ 1.43638.

Chloride: C_6H_9OCl . MW, 132.5. B.p. 57°/25 mm.

Amide: $C_6H_{11}ON$. MW, 113. Plates from C_6H_6 -pet. ether. M.p. 123–4°.

p-Toluidide : $C_{13}H_{17}ON$. MW, 203. Needles from pet. ether — C_6H_6 . M.p. 84° .

Fichter, Gisiger, *Ber.*, 1909, **42**, 4708.

Kon, Linstead, *J. Chem. Soc.*, 1925, **127**, 623.

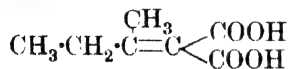
3-Methyl-2-butylene-1-carboxylic Acid.

See Pyroterebic Acid.

3-Methyl-2-butylene-2-carboxylic Acid.

See Trimethylacrylic Acid.

2-Methyl-1-butylene-1 : 1-dicarboxylic Acid (1-Methylpropylidene-malonic acid)



$C_7H_{10}O_4$ MW, 158

Et ester : $C_9H_{14}O_4$. MW, 186. *Nitrile* : $C_9H_{13}O_2N$. MW, 167. B.p. $104-8^\circ/8$ mm. Alc. $KOH \rightarrow$ cyanoacetic acid. $Ba(OH)_2 \rightarrow$ malonic acid.

Scheiber, Meisel, *Ber.*, 1915, **48**, 259.

3-Methyl-1-butylene-1 : 1-dicarboxylic Acid.

See Isobutylidene-malonic Acid.

3-Methyl-1-butylene-1 : 2-dicarboxylic Acid.

See Isopropylfumaric Acid and Isopropylmaleic Acid.

1-Methyl-1-butylene-1 : 3-dicarboxylic Acid.

See 1 : 3-Dimethylglutaconic Acid.

2-Methyl-1-butylene-1 : 3-dicarboxylic Acid.

See 2 : 3-Dimethylglutaconic Acid.

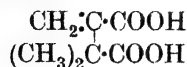
3-Methyl-1-butylene-1 : 3-dicarboxylic Acid.

See 3 : 3-Dimethylglutaconic Acid.

1-Methyl-1-butylene-2 : 3-dicarboxylic Acid.

See 1-Methyl-2-ethylidenesuccinic Acid.

3-Methyl-1-butylene-2 : 3-dicarboxylic Acid (3 : 3-Dimethylitaconic acid)



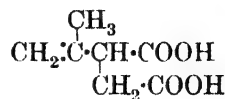
$C_7H_{10}O_4$ MW, 158

Cryst. M.p. $140-1^\circ$. Sol. H_2O , $EtOH$, Et_2O . Spar. sol. C_6H_6 . Insol. pet. ether. $k = 1.67 \times 10^{-4}$ at 25° .

Di-Et ester : $C_{11}H_{18}O_4$. MW, 214. B.p. $173-6^\circ/755-60$ mm., $126-7^\circ/20$ mm. D_{10}^{10} 1.0169, D_{20}^{20} 1.0091. $n_D^{27.4}$ 1.43577.

Bone, Henstock, *J. Chem. Soc.*, 1903, **83**, 1388.

2-Methyl-1-butylene-3 : 4-dicarboxylic Acid (Isopropenylsuccinic acid)



$C_7H_{10}O_4$ MW, 158

Cryst. from H_2O . M.p. $146-7^\circ$. Sol. 7.56% in H_2O at 15° . Sol. 19.47% in Et_2O at 15° .

Fittig, Petkow, *Ann.*, 1899, **304**, 208.

3-Methyl-2-butylene-1 : 2-dicarboxylic Acid.

See Isopropylidenesuccinic Acid.

2-Methyl-2-butylene-1 : 4-dicarboxylic Acid.

See 2-Methyl- Δ^2 -dihydromuconic Acid.

1-Methyl-2-butylene-2 : 3-dicarboxylic Acid.

See dibasic-Hæmatommic Acid.

1-Methyl-1-butylene-1 : 2 : 4-tricarboxylic Acid.

See tribasic-Hæmatommic Acid.

Methyl *n*-butyl Ether (1-Methoxybutane)



$C_5H_{12}O$ MW, 88

B.p. $71^\circ (70.3^\circ)$. D_4^{20} 0.7635, D_4^{15} 0.74773, D_4^{20} 0.74433 (0.7441). n_D^{20} 1.37202, n_D^{20} 1.38306.

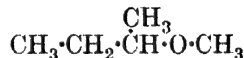
Henry, *Bull. soc. chim.*, 1892, **7**, 150.

Clarke, *J. Chem. Soc.*, 1912, **101**, 1801.

Cerchez, *Bull. soc. chim.*, 1928, **43**, 766.

Bennett, Philip, *J. Chem. Soc.*, 1928, 1930.

Methyl-sec.-*n*-butyl Ether (2-Methoxybutane)

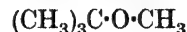


$C_5H_{12}O$ MW, 88

B.p. 59° . D_4^{20} 0.7621, D_4^{20} 0.7415.

Bennett, Philip, *J. Chem. Soc.*, 1928, 1930.

Methyl *tert.*-butyl Ether



$C_5H_{12}O$ MW, 88

B.p. $54-5^\circ/764$ mm. (54°). Insol. H_2O . D^{20} 0.7642, D_4^{20} 0.7578. n_D^{20} 1.37566.

Henry, *Rec. trav. chim.*, 1904, **23**, 327.

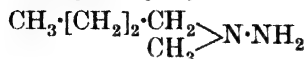
Lazinski, Swadkowski, *Chem. Zentr.*, 1903, **I**, 1119.

Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2095.

Edlund, Evans, U.S.P., 1,968,601, (*Chem. Abstracts*, 1934, **28**, 5831).

Methylbutylethylene.

See 2-Heptene, 2-Methyl-1-hexene, and 4-Methyl-2-hexene.

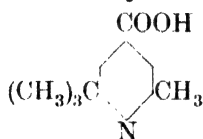
unsym.-Methylbutylhydrazine

$\text{C}_5\text{H}_{14}\text{N}_2$ MW, 102

B.p. 50–51°/38 mm. D_4^{20} 0.8092, D_4^{21} 0.804. n_D^{21} 1.4258. Misc. with H_2O , EtOH , Et_2O .

Franchimont, van Erp, *Rec. trav. chim.*, 1895, **14**, 318.

Brühl, *Ber.*, 1897, **30**, 161.

2-Methyl-6-tert.-butylisonicotinic Acid

$\text{C}_{13}\text{H}_{15}\text{O}_2\text{N}$ MW, 217

Plates from H_2O . M.p. 219°. Very sol. EtOH , NaOH , dil. HCl . Sol. Me_2CO , H_2O , AcOEt , C_6H_6 , pet. ether. Spar. sol. Et_2O .

Mumm, Neumann, *Ber.*, 1926, **59**, 1623.

Methyl n-butyl Ketone (Hexanone-2, 2-ketohexane)

$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. 127°/761 mm. (126–126.5°/760 mm.). D_4^{20} 0.8298. Heat of comb. C_v 901.0 Cal., C_p (liq.) 902.5 Cal., C_p (gas) 916.7 Cal. $\text{CrO}_3 \rightarrow$ acetic, butyric, and valeric acids. $\text{H} (+\text{Ni}) \rightarrow$ methyl-n-butylcarbinol. Forms bisulphite comp.

Oxime : b.p. 185°/757 mm. slight decomp., 138°/112 mm. D_4^{20} 0.8971. n_D^{20} 1.4464.

Semicarbazone : m.p. 118°.

2 : 4-Dinitrophenylhydrazine : m.p. 106°.

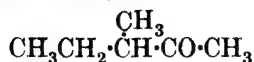
Michael, Hartman, *Ber.*, 1907, **40**, 144.

Wagner, *J. prakt. Chem.*, 1891, **44**, 285.

Clarke, *J. Am. Chem. Soc.*, 1909, **31**, 560.

Grignard, Chambret, *Compt. rend.*, 1926, **182**, 299.

Grignard, Fluchaire, *Ann. chim.*, 1928, **9**, 14.

Methyl sec.-n-butyl Ketone (3-Methylpentanone-2, 2-keto-3-methylpentane, 2-acetobutane)

$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. 118°. D_4^{14} 0.8181, D_4^{18} 0.8145, D_4^{20} 0.811. n_D^{18} 1.4002.

Oxime : b.p. 89°/20 mm.

Wislicenus, *Ann.*, 1883, **219**, 308.

Courtot, *Bull. soc. chim.*, 1906, **35**, 981.

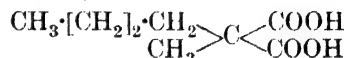
Tafel, *Ber.*, 1912, **45**, 452.

Methyl tert.-butyl Ketone.

See Pinacolin.

1-Methyl-2-tert.-butyl-lactic Acid.

See 1-Hydroxy-1 : 3-dimethylisocaproic Acid.

Methylbutylmalonic Acid (Hexane-2 : 2-dicarboxylic acid)

$\text{C}_8\text{H}_{14}\text{O}_4$ MW, 174

Needles from C_6H_6 -pet. ether. M.p. 99–101°. Sol. H_2O , EtOH , Et_2O .

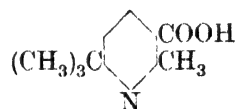
Di-Me ester : $\text{C}_{10}\text{H}_{18}\text{O}_4$. MW, 202. B.p. 219–21°.

Di-Et ester : $\text{C}_{12}\text{H}_{22}\text{O}_4$. MW, 230. B.p. 237°.

Rasetti, *Bull. soc. chim.*, 1905, **33**, 687.

2-Methyl-n-butyl Mercaptan.

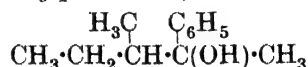
See active-Amyl Mercaptan.

2-Methyl-6-tert.-butylpicotinic Acid

$\text{C}_{13}\text{H}_{15}\text{O}_2\text{N}$ MW, 217

Plates from H_2O . M.p. 137–8°. Very sol. EtOH , dil. HCl . Sol. H_2O , Me_2CO , AcOEt , C_6H_6 , pet. ether. Spar. sol. Et_2O .

Mumm, Neumann, *Ber.*, 1926, **59**, 1623.

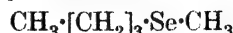
Methyl-sec.-n-butylphenylcarbinol (3-Methyl-2-phenylpentanol-2)

$\text{C}_{12}\text{H}_{18}\text{O}$ MW, 178

Mobile liq. B.p. 129–30°/20 mm. D_4^{20} 0.952. n_D^{18} 1.5157. Does not form a phenylurethane.

Apolit, *Ann. chim.*, 1924, **2**, 88.

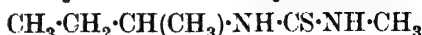
Bodroux, Taboury, *Compt. rend.*, 1909, **148**, 1675.

Methyl butyl selenide

$\text{C}_5\text{H}_{12}\text{Se}$ MW, 151

B.p. 141°/760 mm. D_4^{25} 1.1875. $n_D^{24.5}$ 1.47710.

Tschugajew, *Ber.*, 1909, **42**, 52.

N-Methyl-N'-sec.-n-butylthiourea

$\text{C}_6\text{H}_{14}\text{N}_2\text{S}$ MW, 146

1-Methylbutyraldehyde

d.
Prisms. M.p. 84°. $[\alpha]_D^{20} + 30.5^\circ$ in EtOH,
+ 29.5° in CHCl₃.

dl.

Cryst. from EtOH.Aq. M.p. 79–80°.

Urban, *Arch. Pharm.*, 1904, **242**, 59.

Dixon, *J. Chem. Soc.*, 1893, **63**, 322.

1-Methylbutyraldehyde (Methylethylacetaldehyde)



C₅H₁₀O MW, 86

B.p. 92–3°. Insol. H₂O. Polymerised by HCl.

Oxime: b.p. 149–51°/749 mm.

Semicarbazone: needles from EtOH.Aq. M.p. 103°.

2:4-Dinitrophenylhydrazone: cryst. from EtOH. M.p. 120.5°.

Azine: b.p. 200–2°.

Linstead, Mann, *J. Chem. Soc.*, 1930, 2069.

Neustädter, *Monatsh.*, 1906, **27**, 928.

2-Methylbutyraldehyde.

See Isovaleraldehyde.

Methyl butyrate



C₅H₁₀O₂ MW, 102

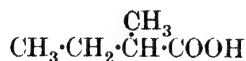
B.p. 102.3°/760 mm. D_4^{20} 0.91939 (0.92006), D_4^{20} 0.8982, D_4^{102} 0.8054. n_D^{20} 1.38693, n_D^{20} 1.39359, n_D^{20} 1.39742.

Young, Thomas, *J. Chem. Soc.*, 1893, **63**, 1229.

Gartenmeister, *Ann.*, 1886, **233**, 267.

Administration der Minenvon Buchsweiler Akt.-Ges., D.R.P., 232,818, (*Chem. Zentr.*, 1911, I, 1090).

1-Methylbutyric Acid (Methylethylacetic acid, butane-2-carboxylic acid)



C₅H₁₀O₂ MW, 102

d.

B.p. 177° (174°). D_4^{20} 0.9419. $[\alpha]_D^{21} + 17.6^\circ$, $[\alpha]_D^{24} + 18.2^\circ$.

Me ester: C₆H₁₂O₂. MW, 116. B.p. 113°/713–15 mm. D_4^{22} 0.882. $n_D^{20.7}$ 1.3936. $[\alpha]_D^{22} + 22.03^\circ$.

Et ester: C₇H₁₄O₂. MW, 130. B.p. 131–3°/730 mm. D_4^{22} 0.864. $n_D^{20.4}$ 1.3964. $[\alpha]_D^{22} + 17.59^\circ$.

Propyl ester: C₈H₁₆O₂. MW, 144. B.p.

640 2-Methyl-4-butrylphloroglucinol 1-methyl Ether

154–7°/730 mm. D_4^{22} 0.860. $n_D^{20.4}$ 1.4033. $[\alpha]_D^{22} + 15.29^\circ$.

Isopropyl ester: b.p. 140–4°/727 mm. D^{15-20} 0.8510.

Butyl ester: C₉H₁₈O₂. MW, 158. B.p. 173–6°/730 mm. D_4^{22} 0.856. $n_D^{20.2}$ 1.4090. $[\alpha]_D^{22} + 13.87^\circ$.

sec.-n-Butyl ester: b.p. 164–7°/727 mm. D^{15-20} 0.8534.

Isobutyl ester: b.p. 165–7°/715 mm. D_4^{22} 0.855. n_D^{20} 1.4059. $[\alpha]_D^{22} + 13.78^\circ$.

Isoamyl ester: C₁₀H₂₀O₂. MW, 172. B.p. 185–7°/720 mm. D^{17} 0.857.

Amide: C₈H₁₁ON. MW, 101. Cryst. M.p. 111°. Sol. H₂O, EtOH, CHCl₃. Spar. sol. pet. ether, C₆H₆. $[\alpha]_D + 18^\circ 19'$ in H₂O.

Brucine salt: C₅H₁₀O₂·C₂₃H₂₆O₄N₂·3H₂O. Prisms. M.p. 95°, anhyd. 30–3°.

l.

B.p. 176–7° (173–4°). D_4^{20} 0.934. $[\alpha]_D - 17.85^\circ$.

Brucine salt: prisms. M.p. 100°, anhyd. 88°. Spar. sol. cold H₂O.

dl.

B.p. 177° (175°/767 mm.). D_{20}^{20} 0.938. $D_{17.4}^{24}$ 0.938. $k = 1.68 (1.64) \times 10^{-5}$ at 25°.

Et ester: b.p. 133.5°. $D_{17.8}^{22}$ 0.8695.

Chloride: C₅H₉OCl. MW, 120.5. B.p. 115–16°.

Amide: cryst. from Et₂O. M.p. 112°.

Anhydride: C₁₀H₁₈O₃. MW, 186. B.p. 103–4°/17 mm.

Nitrile: C₅H₉N. MW, 83. B.p. 125°. D_4^{20} 0.8061.

Hydrazide: m.p. 78°.

Gilman, Kirby, *Organic Syntheses*, Collective Vol. I, 1932, 353.

Auwers, Fritzweiler, *Ann.*, 1897, **298**, 166.

Saur, *Ann.*, 1877, **188**, 261.

Marckwald, *Ber.*, 1904, **37**, 352, 1045, 1368.

Guye, Chavanne, *Bull. soc. chim.*, 1896, **15**, 295.

Taverne, *Rec. trav. chim.*, 1894, **13**, 197.

2-Methylbutyric Acid.

See Isovaleric Acid.

2-Methylbutyrolactam.

See 4-Methyl-2-pyrrolidone.

Methylbutyrophenone.

See Propyl tolyl Ketone.

2-Methyl-4-butrylphloroglucinol 1-methyl Ether.

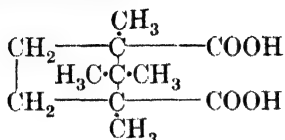
See Aspidinol.

Oxime: needles from MeOH.Aq. M.p. 132-3°. Very volatile.

Semicarbazone: plates from EtOH. M.p. 255-7° decomp.

Bredt-Savelsberg, Buchkremer, *Ber.*, 1931, 64, 600.

3-Methylcamphoric Acid



$\text{C}_{11}\text{H}_{18}\text{O}_4$ MW, 214

Cryst. M.p. 191°. Sol. hot H_2O , EtOH, Et_2O .

Dichloride: $\text{C}_{11}\text{H}_{16}\text{O}_2\text{Cl}_2$. MW, 251. B.p. 155°/15 mm.

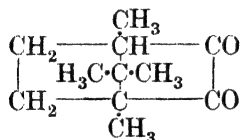
Monoamide: $\text{C}_{11}\text{H}_{19}\text{O}_3\text{N}$. MW, 213. Cryst. M.p. 162-3°.

Anhydride: cryst. M.p. 205.5-207°.

Bredt-Savelsberg, *J. prakt. Chem.*, 1918, 98, 100.

Nametkin, Chuchrikoff, *Ann.*, 1923, 432, 221.

4-Methylcamphorquinone



$\text{C}_{11}\text{H}_{16}\text{O}_2$ MW, 180

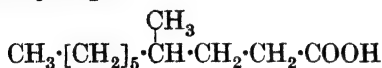
Yellow cryst. from EtOH. M.p. 199-200°.

In daylight \rightarrow 3-methylcamphoric anhydride.

Hydrazone: cryst. M.p. 108-9°.

Nametkin, Brüssoff, *J. prakt. Chem.*, 1932, 135, 155.

3-Methylcapric Acid



$\text{C}_{11}\text{H}_{22}\text{O}_2$ MW, 186

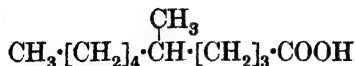
Oil. B.p. 150-2°/12 mm.

p-Toluidide: m.p. 34-6°.

1-Naphthalide: m.p. 61-2°.

Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, 7, 255.

4-Methylcapric Acid



$\text{C}_{11}\text{H}_{22}\text{O}_2$ MW, 186

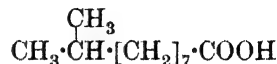
l.

B.p. 135°/3 mm. D_4^{25} 0.893. $[\alpha]_D^{25} - 0.18^\circ$.

Et ester: $\text{C}_{13}\text{H}_{26}\text{O}_2$. MW, 214. B.p. 140°/25 mm. D_4^{24} 0.864.

Levene, Marker, *J. Biol. Chem.*, 1932, 95, 153; 1933, 103, 299.

8-Methylcapric Acid

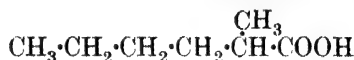


$\text{C}_{11}\text{H}_{22}\text{O}_2$ MW, 186

Plates. B.p. 174-174.5°/23 mm.

Levene, Allen, *J. Biol. Chem.*, 1916, 27, 449.

1-Methylcaproic Acid (1-Methylhexoic acid, 1-butylpropionic acid, methylbutylacetic acid)



$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

d.

Oil. B.p. 105°/5 mm. $[\alpha]_D^{25} + 19.6^\circ$ in Et_2O .

Chloride: $\text{C}_7\text{H}_{13}\text{OCl}$. MW, 148.5. B.p. 45-8°/9 mm.

l.

Oil. B.p. 105°/5 mm. $[\alpha]_D^{25} - 15.25^\circ$ in Et_2O . D_4^{25} 0.909. n_D^{25} 1.4189.

dl.

Oil. B.p. 209.6°, 203-5°/683 mm., 100°/12 mm. Misc. with EtOH, Et_2O , MeOH, CHCl_3 , CS_2 , C_6H_6 in all proportions.

Me ester: $\text{C}_8\text{H}_{16}\text{O}_2$. MW, 144. B.p. 159-60°.

Et ester: $\text{C}_9\text{H}_{18}\text{O}_2$. MW, 158. B.p. 174-5°.

Chloride: b.p. 45-8°/9 mm.

Amide: $\text{C}_7\text{H}_{15}\text{ON}$. MW, 129. Needles from H_2O . M.p. 70-72.5°.

Anilide: cryst. from EtOH. M.p. 98°.

p-Bromoanilide: cryst. from EtOH. M.p. 114°.

p-Toluidide: cryst. M.p. 85°.

p-Anisidide: cryst. M.p. 103°.

Reichstein, Trivelli, *Helv. Chim. Acta*, 1932, 15, 258.

Levene, Mikeska, *J. Biol. Chem.*, 1929, 84, 571.

Rasetti, *Bull. soc. chim.*, 1905, 33, 689.

2-Methylcaproic Acid (2-Methylhexoic acid, 2-propylbutyric acid)



$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

d.

Chloride: $\text{C}_7\text{H}_{13}\text{OCl}$. MW, 148.5. B.p. 82°/50 mm. D_4^{25} 0.954. n_D^{25} 1.4293. $[\alpha]_D^{25} + 2.47^\circ$.

Amide: $C_7H_{15}ON$. MW, 129. Cryst. M.p. 91° . $[\alpha]_D^{25} - 4.16^\circ$ in EtOH.

Nitrile: $C_7H_{13}N$. MW, 111. B.p. $95^\circ/70$ mm. $D_4^{25} 0.810$. $n_D^{25} 1.4137$. $[\alpha]_D^{25} 3.28^\circ$.

p-Nitrophenyl ester: b.p. $124.5^\circ/0.15$ mm. $[\alpha]_D^{23.5} 1.45^\circ$. $D_4^{25} 1.1121$. $n_D^{25} 1.5113$.

l.

Oil. B.p. $113^\circ/17$ mm. $D_4^{27} 0.911$. $n_D^{25} 1.4214$. $[\alpha]_D^{27} - 2.52^\circ$. Undergoes Walden inversion on treatment with $SOCl_2$.

Et ester: $C_9H_{18}O_2$. MW, 158. B.p. $60^\circ/10$ mm. $D_4^{27} 0.806$. $n_D^{30} 1.4102$. $[\alpha]_D^{27} - 0.42^\circ$, $[\alpha]_D^{29} - 1.86^\circ$ in C_6H_6 , -1.91° in $CHCl_3$.

dl.

B.p. $212-13^\circ/755$ mm. $D_4^{20} 0.9187$. $n_D^{20} 1.4222$.

Et ester: b.p. $176-7^\circ/756$ mm. $D_4^{20} 0.8679$. $n_D^{20} 1.4119$.

Chloride: b.p. $163-4^\circ/751$ mm. $D_4^{20} 0.967$.

Amide: cryst. from EtOH.Aq. M.p. 97° .

Nitrile: b.p. $171-2^\circ/749$ mm. $D_4^{20} 0.8109$. $n_D^{20} 1.4143$.

Dewall, Wechering, *Bull. soc. chim. Belg.*, 1924, **33**, 495.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.

Stevens, *J. Am. Chem. Soc.*, 1934, **56**, 997.

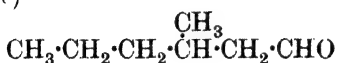
3-Methylcaproic Acid.

See active-Amylactic Acid.

4-Methylcaproic Acid.

See Isoamylacetic Acid.

2-Methylcaproic Aldehyde (2-Propylbutyraldehyde)



$C_7H_{14}O$ MW, 114

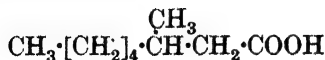
B.p. $141^\circ/725$ mm. $D_4^{20} 0.8203$. $n_D^{20} 1.4122$.

Semicarbazone: m.p. $108-9^\circ$.

Fourneau, Benoit, Firmenich, *Bull. soc. chim.*, 1930, **47**, 858.

Dewael, Weckering, *Bull. soc. chim. Belg.*, 1924, **33**, 495.

2-Methylcaprylic Acid



$C_9H_{16}O_2$ MW, 156

d.

Chloride: $C_9H_{15}OCl$. MW, 174.5. B.p. $95^\circ/20$ mm. $D_4^{24} 0.935$. $n_D^{25} 1.4362$. $[\alpha]_D^{24} + 1.36^\circ$.

Amide: $C_9H_{17}ON$. MW, 155. $[\alpha]_D^{24} - 6.68^\circ$.

Nitrile: $C_9H_{15}N$. MW, 137. B.p. $135^\circ/85$ mm. $D_4^{23} 0.813$. $n_D^{25} 1.4239$. $[\alpha]_D^{25} + 4.02^\circ$.

l.

B.p. $135^\circ/16$ mm. $D_4^{23} 0.899$. $n_D^{25} 1.4298$. $[\alpha]_D^{23} - 4.57^\circ$.

Et ester: $C_{11}H_{20}O_2$. MW, 184. B.p. $117^\circ/35$ mm. $D_4^{23} 0.860$. $n_D^{25} 1.4200$. $[\alpha]_D^{23} - 2.03^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 95.

3-Methylcaprylic Acid



$C_9H_{16}O_2$ MW, 156

l.

B.p. $149^\circ/22$ mm. $D_4^{25} 0.871$. $[\alpha]_D^{25} - 1.33^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 162.

4-Methylcaprylic Acid



$C_9H_{16}O_2$ MW, 156

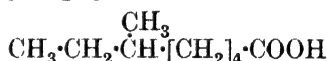
l.

B.p. $127^\circ/5$ mm. $D_4^{25} 0.901$. $[\alpha]_D^{25} - 0.37^\circ$.

Et ester: $C_{11}H_{20}O_2$. MW, 184. B.p. $112^\circ/30$ mm. $D_4^{22} 0.865$.

See previous reference.

5-Methylcaprylic Acid



$C_9H_{16}O_2$ MW, 156

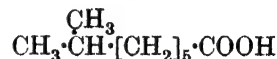
d.

B.p. $139^\circ/20$ mm. $D_4^{25} 0.899$. $[\alpha]_D^{25} + 2.49^\circ$.

Et ester: $C_{11}H_{20}O_2$. MW, 184. B.p. $110^\circ/25$ mm. $D_4^{24} 0.868$.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 163; 1933, **103**, 299.

6-Methylcaprylic Acid



$C_9H_{16}O_2$ MW, 156

B.p. $248^\circ/765$ mm., $140.5^\circ/15$ mm. Very spar. sol. H_2O .

Et ester: $C_{11}H_{20}O_2$. MW, 184. B.p. $220.5^\circ/765$ mm.

Amide: $C_9H_{17}ON$. MW, 155. Cryst. M.p. 106.5° .

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 433.

Methylcarbamic Acid (Methylaminoformic acid)



$C_2H_5O_2N$ MW, 75

Not known in free state.

Methylamine salt: $C_2H_5O_2N \cdot CH_3NH_2$. Cryst. M.p. 105° . Very sol. H_2O , EtOH. Heat at $170^\circ \rightarrow$ dimethylurea.

Ester: see Methylurethane.

Amide: see Methylurea.

Chloride: C_2H_4ONCl . MW, 93.5. Cryst. M.p. about 90° .

Schmidt, *Ber.*, 1903, **36**, 2476.


Gattermann, Schmidt, *Ann.*, 1888, **244**, 35.

Fichter, Becker, *Ber.*, 1911, **44**, 3481.

Methylcarbanilic Acid.

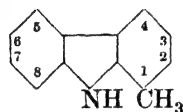
See *N*-Methylphenylcarbamic Acid and Toly-carbamic Acid.

***N*-Methylcarbanilide** (*N*-Methyl-sym.-di-phenylurea)

$C_{14}H_{14}ON_2$  MW, 226
Needles from EtOH or xylene. M.p. 106° (104°). B.p. $203-5^\circ$ decomp. Very sol. Et_2O , C_6H_6 , $CHCl_3$, AcOH. Spar. sol. hot H_2O , cold EtOH. Insol. ligroin. Dist. \rightarrow methyl-aniline + phenyl isocyanate.

Gebhardt, *Ber.*, 1884, **17**, 2093.

1-Methylcarbazole



$C_{13}H_{11}N$ MW, 181

Plates from ligroin. M.p. 120.5° . Sol. EtOH, Et_2O , AcOH, C_6H_6 . Spar. sol. ligroin.

Picrate: red needles from EtOH. M.p. 143.5° .

Ullmann, *Ann.*, 1904, **332**, 86.

2-Methylcarbazole.

Plates from EtOH. M.p. 259° .

Picrate: red needles from C_6H_6 . M.p. 167° .

Borsche, *Ann.*, 1908, **359**, 75.

3-Methylcarbazole.

Plates from AcOH. M.p. 207° . Sol. Et_2O , C_6H_6 . Spar. sol. EtOH, AcOH. Pale green sol. in H_2SO_4 , addn. of $HNO_3 \rightarrow$ deep green.

Picrate: scarlet needles from C_6H_6 . M.p. 179° .

Oakeshott, Plant, *J. Chem. Soc.*, 1926, 1212.

Ullmann, *Ber.*, 1898, **31**, 1697.

N-Methylcarbazole.

See under Carbazole.

Methylcarbithionic Acid.

See Dithioacetic Acid.

5-Methylcarbostyryl.

See 2-Hydroxy-4-methylquinoline.

Methyl-carboxybenzyl Alcohol.

See Hydroxymethyl-toluic Acid.

Methyl carboxybenzyl Ketone.

See Methyl benzyl Ketone carboxylic Acid.

5-Methyl-4-carboxy- α -furylacetic Acid.

See Methronic Acid.

N-Methyl-2-carboxymethylpiperidine-4-carboxylic Acid.

See Granatic Acid.

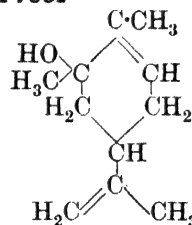
2-[*N*-Methyl-4-carboxypiperidyl]-acetic Acid.

See Granatic Acid.

Methylcarbylamine.

See Methyl isocyanide.

6-Methylcarveol



$C_{11}H_{18}O$ MW, 166

Oil. B.p. $117-18^\circ/19$ mm., $101-2^\circ/8.5$ mm. D_{20}^{20} 0.9449, D_4^{20} 0.9471. n_D^{20} 1.4911. $[\alpha]_D^{20} + 40.44^\circ$, $[\alpha]_D^{20}$ + 36.08° .

Klages, Sommer, *Ber.*, 1906, **39**, 2309.

Rupe, Emmerich, *Ber.*, 1908, **41**, 1397.

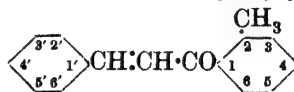
Methylcatechol.

See 2 : 3-Dihydroxytoluene and Homocatechol.

α -Methylchalkone.

See Dypnone.

2-Methylchalkone (*o*-Tolyl styryl ketone)



$C_{16}H_{14}O$ MW, 222

Oil. B.p. $209-11^\circ/19$ mm., $197^\circ/7$ mm.

Weygand, Schachter, *Ber.*, 1935, **68**, 231.

3-Methylchalkone (*m*-Tolyl styryl ketone).

Exists in two forms.

(i) *Stable form*:

Yellow needles. M.p. 61° .

Dipicrate: cryst. from C_6H_6 . M.p. 107° .

(ii) *Labile form*:

M.p. 51° .

See previous reference.

4-Methylchalkone (*p-Tolyl styryl ketone*).

Exists in seven forms, m.ps., 74·5°, 56·5°, 55·5°, 54·5°, 48°, 46·5°, 44·5°.

Oxime: m.p. 130–2°.

Picrate: m.p. 99–100°.

Weygand, Baumgärtel, *Ann.*, 1929, **469**, 253.

Stobbe, Bremer, *J. prakt. Chem.*, 1929, **123**, 1.

2'-Methylchalkone (*Phenyl o-methylstyryl ketone*).

Oil. B.p. 218–19°/12 mm.

Weygand, Schächer, *Ber.*, 1935, **68**, 231.

3'-Methylchalkone (*Phenyl m-methylstyryl ketone*).

Exists in four forms.

Stable form:

Yellow needles from EtOH. M.p. 66°.

Three labile forms:

Cryst. M.ps., 53°, 67°, 68°, all of which are interconvertible.

See previous reference.

4'-Methylchalkone (*Phenyl p-methylstyryl ketone*).

Yellow needles from ligroin. M.p. 96·5°. Very sol. most org. solvents.

Oxime: needles from EtOH. M.p. 91°.

Hanzlik, Bianchi, *Ber.*, 1899, **32**, 2283.

Methylchavicol.

See Esdragol.

Methyl chloride (*Chloromethane*)

MW, 50·5

Colourless gas. M.p. – 93°. B.p. – 24·09°. Sol. to 4 parts by vol. in H₂O at 16°, 35 parts in EtOH, 40 parts in AcOH. Crit. temp. 416·2°. Crit. press. 65·09 atm. Used extensively as refrigerant and fire extinguisher.

Norris, Taylor, *J. Am. Chem. Soc.*, 1924, **46**, 752.

Methyl 1-chloroethyl Ether

C₃H₇OCl MW, 94·5

B.p. 72–3°/751 mm. D₄²⁰ 0·9902. n_D²⁰ 1·4004. Hydrolyses and polymerises readily.

Henze, Murchison, *J. Am. Chem. Soc.*, 1931, **53**, 4077.

Methyl 2-chloroethyl Ether

C₃H₇OCl MW, 94·5

B.p. 90·5°. D₄²⁰ 1·031. 100 parts H₂O dissolve 8 parts by weight at ord. temp.

Bennet, Heathcot, *J. Chem. Soc.*, 1929, 270.

Swallen, Boord, *J. Am. Chem. Soc.*, 1930, **52**, 653.

Methyl 1-chloroethyl Ketone (*3-Chlorobutanone*)

C₄H₇OCl MW, 106·5

B.p. 115°, 40°/30 mm. KCN → 1-acetopropionitrile. HNO₃ → 1-chloropropionic acid. *Semicarbazone*: needles from AcOEt. M.p. 138–9°.

Curd, Robertson, *J. Chem. Soc.*, 1933, 717.

Methyl 2-chloroethyl Ketone (*4-Chlorobutanone*)

C₄H₇OCl MW, 106·5

B.p. 50–5°/16 mm. NH₂OH → 3-methylisoxazoline. H₂N·NH₂ → 3-methylpyrazoline. C₆H₅·NH·NH₂ → 3-methyl-1-phenylpyrazoline.

Schering-Kahlbaum, U.S.P., 1,737,203, (*Chem. Abstracts*, 1930, **24**, 626).

Maire, *Bull. soc. chim.*, 1908, **3**, 268.

Methyl 2-chloroethyl sulphide

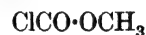
C₃H₇ClS MW, 110·5

B.p. 44°/20 mm. D₂₀²⁰ 1·1245. n_D²⁰ 1·4902. Vesicant.

Kirner, *J. Am. Chem. Soc.*, 1928, **50**, 2452.

Methylchloroform.

See 1 : 1 : 1-Trichloroethane.

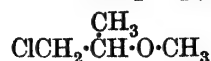
Methyl chloroformate

C₂H₃O₂Cl MW, 94·5

B.p. 72–3°/767 mm. D₄²⁰ 1·2231. n_D²⁰ 1·38675. Burns with green flame. Decomp. by boiling H₂O.

Klepl, *J. prakt. Chem.*, 1882, **26**, 448.

Karvonen, *Chem. Zentr.*, 1919, III, 808.

Methyl 2-chloroisopropyl Ether

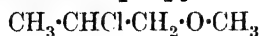
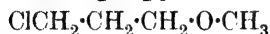
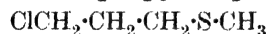
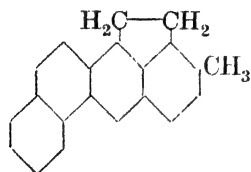
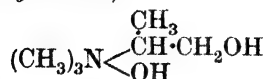
C₄H₉OCl MW, 108·5

B.p. 103–4°/760 mm. D₄²⁰ 1·009. n_D²⁰ 1·41372.

Dewael, *Bull. soc. chim., Belg.*, 1930, **39**, 395.

Methyl chloromethyl Ether.

See Chlorodimethyl Ether.

Methyl 2-chloropropyl EtherC₄H₉OCl MW, 108.5B.p. 98–9°/756 mm. D₂₀ 0.9946. n_D²⁰ 1.40754.Dewael, *Bull. soc. chim. Belg.*, 1925, **34**, 343.**Methyl 3-chloropropyl Ether**C₄H₉OCl MW, 108.5B.p. 110.4–110.6°/756.6 mm. (109–12°). D₄⁰ 1.0233, D₂₀⁰ 1.0013. n_D²⁰ 1.41308.Karvonen, *Chem. Zentr.*, 1912, II, 1271.Paul, *Ann. chim.*, 1932, **18**, 315.**Methyl 3-chloropropyl sulphide**C₄H₉ClS MW, 124.5B.p. 71.2°/29 mm. D₂₀⁰ 1.0863. n_D²⁰ 1.4833.Kirner, *J. Am. Chem. Soc.*, 1928, **50**, 2453.**Methylcholanthrene**C₂₁H₁₆ MW, 268Straw-yellow needles from C₆H₆. M.p. 176.5–177.5°. Does not react with maleic anhydride. Very potent carcinogenic compound.Picrate: purplish-black needles from C₆H₆. M.p. 180–1° (177–8°).Cook, Haslewood, *J. Chem. Soc.*, 1934, 430.Fieser, Seligman, *J. Am. Chem. Soc.*, 1935, **58**, 228.**α-Methylcholine** (Trimethylhydroxyisopropylammonium hydroxide)C₆H₁₇O₂N MW, 135

Colourless syrup. Very hygroscopic. Reacts alkaline. Intrajejunal administrations of large doses in anaesthetised dogs causes variations of blood pressure, hypotension, tachycardia, and bradycardia. The acetyl derivs. are more suitable than acetylcholine. Compound

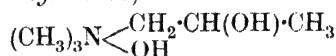
described as α-methylcholine in early literature is incorrectly named.

Iodide: m.p. 296°.

Acetyl: m.p. 152–4°.

B,HAuCl₄: m.p. 247°.B₂H₂PtCl₆: m.p. 228°.

Picrate: m.p. 265°.

Major, Cline, *J. Am. Chem. Soc.*, 1932, **54**, 242.Karrer, *Helv. Chim. Acta*, 1922, **5**, 477.**β-Methylcholine** (Trimethylhydroxypropylammonium hydroxide)C₆H₁₇O₂N MW, 135

Identical in properties with α-methylcholine.

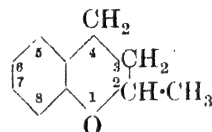
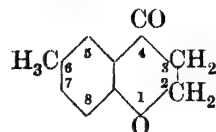
Chloride: needles from butyl alcohol. M.p. 165°.

Acetyl: very hygroscopic solid. M.p. 172–3°.

B,HAuCl₄: m.p. 196°.B₂H₂PtCl₆: m.p. 257°.

Picrate: needles from EtOH. M.p. 163°.

See first reference above.

2-MethylchromanC₁₀H₁₂O MW, 148Liq. with peppermint-like odour. B.p. 223–6°, 100–102°/11 mm. n_D^{18.5} 1.532. Sol. most org. solvents. Sol. conc. H₂SO₄ → red sol.Harries, Busse, *Ber.*, 1895, **28**, 502.Stoermer, Schäffer, *Ber.*, 1903, **36**, 2872.Baker, Walker, *J. Chem. Soc.*, 1935, 648.**6-Methylchroman.**Yellowish liq. with peppermint-like odour. B.p. 234°, 107°/12 mm. D₄¹⁴ 1.0374. n_D¹⁴ 1.542.Auwers, *Ann.*, 1918, **415**, 154.v. Braun, Grabowski, Kirschbaum, *Ber.*, 1913, **46**, 1273.**6-Methylchromanone**C₁₀H₁₀O₂ MW, 162Prisms from pet. ether. M.p. 34–6°. B.p. 141–3°/13.5 mm. D₄^{17.3} 1.1245. n_D^{27.1} 1.555. Very sol. org. solvents.

Oxime: needles from pet. ether. M.p. 84–5°. Very sol. MeOH, EtOH.

p-Nitrophenylhydrazone: orange-red needles from MeOH–Me₂CO. M.p. 222°. Sol. hot Me₂CO. Spar. sol. EtOH.

Semicarbazone: prisms from AcOH. M.p. 248–9°. Sol. hot AcOH. Very spar. sol. MeOH, EtOH, AcOEt.

Auwers, Krollpfeiffer, *Ber.*, 1914, **47**, 2587.

Powell, Johnson, *J. Am. Chem. Soc.*, 1924, **46**, 2863.

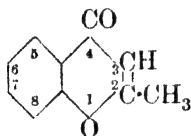
7-Methylchromanone.

Pale yellow liq. B.p. 138°/13 mm.

Oxime: needles from hot H₂O. M.p. 98–9°.

Powell, Johnson, *J. Am. Chem. Soc.*, 1924, **46**, 2863.

2-Methylchromone



C₁₀H₈O₂

MW, 160

Needles from pet. ether. M.p. 72–3° (70–1°). Sol. conc. H₂SO₄ with violet-blue fluor.

Bloch, v. Kostanecki, *Ber.*, 1900, **33**, 1999.

Simonis, Remmert, *Ber.*, 1914, **47**, 2232.

Wittig, Bangert, Richter, *Ann.*, 1925, **446**, 169.

6-Methylchromone.

Needles from boiling H₂O. M.p. 88–9°. Sol. EtOH, ligroin. Sol. conc. H₂SO₄ with blue fluor.

Oxamino-oxime: needles from MeOH. M.p. 143–4°.

Ruhemann, Bauer, *J. Chem. Soc.*, 1901, **79**, 474.

7(or 5-)Methylchromone.

Needles from H₂O. M.p. 72–3°. Sol. EtOH, Et₂O, CHCl₃. Spar. sol. boiling H₂O. Sol. conc. H₂SO₄ with blue fluor.

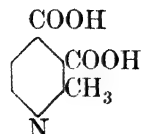
Ruhemann, Bausor, *J. Chem. Soc.*, 1901, **79**, 473.

8-Methylchromone.

Needles from pet. ether. M.p. 84–5°. Very sol. EtOH. Sol. hot H₂O. Sol. conc. H₂SO₄ with blue fluor.

See previous reference.

2-Methylcinchomeronic Acid (α -Picoline-3:4-dicarboxylic acid)



C₈H₇O₄N

MW, 181

Plates or needles from H₂O. M.p. 250–5° decomp. Spar. sol. H₂O. Almost insol. Et₂O, C₆H₆, ligroin.

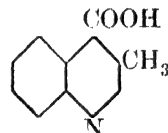
Anhydride: needles from ligroin. M.p. 92°.

Mumm, Hüneke, *Ber.*, 1918, **51**, 158.

2-Methylcinchoninic Acid.

See Quinaldine-4-carboxylic Acid.

3-Methylcinchoninic Acid (3-Methylquinoline-4-carboxylic acid)



C₁₁H₉O₂N

MW, 187

Plates from H₂O. M.p. 254°. Spar. sol. Me₂CO. Insol. Et₂O, C₆H₆, ligroin.

Miller, *Ber.*, 1890, **23**, 2257.

Methylcinchophene.

See Methyl-2-phenylquinoline-4-carboxylic Acid and 2-*p*-Tolylquinoline-4-carboxylic Acid.

α -Methylcinnamaldehyde (1-Benzylidene-propionaldehyde, 1-methyl-2-phenylacrolein)



C₁₀H₁₀O

MW, 146

B.p. 150°/100 mm. (148–9°/27 mm.), 131–2°/16 mm. *D*₄¹⁷ 1.0407. *n*_D¹⁷ 1.6057.

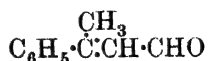
Semicarbazone: cryst. from EtOH.Aq. M.p. 207–8°.

v. Miller, Kinkelin, *Ber.*, 1886, **19**, 526.

Auwers, *Ber.*, 1912, **45**, 2777.

Knorr, Weissenborn, U.S.P., 1,716,822, (*Chem. Abstracts*, 1929, **23**, 3214).

β -Methylcinnamaldehyde (2-Benzylidene-propionaldehyde, 2-methyl-2-phenylacrolein)



C₁₀H₁₀O

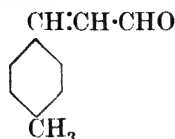
MW, 146

B.p. 122–30°/12 mm.

Semicarbazone: yellow needles from EtOH. M.p. 201°.

Rupe, Giesler, *Helv. Chim. Acta*, 1928, 11, 656.

p-Methylcinnamaldehyde (2-p-Tolylacrolein)



$\text{C}_{10}\text{H}_{10}\text{O}$

MW, 146

Yellow leaflets from EtOH.Aq. M.p. 41·5°. B.p. 154°/25 mm. Very labile.

Oxime: leaflets from EtOH. M.p. 136°.

Semicarbazone: needles from EtOH. M.p. 210°.

Scholtz, Wiedemann, *Ber.*, 1903, 36, 850.

Methyl cinnamate



$\text{C}_{10}\text{H}_{10}\text{O}_2$

MW, 162

Occurs in essential oil of various plants. Cryst. from pet. ether or EtOH.Aq. M.p. 36·5° (34·7°). B.p. 261°/750 mm., 148·8°/100 mm., 142·5°/20 mm., 126·8°/10 mm., 112·0°/5 mm. D_4^{25} 1·0700, D_4^{30} 1·0573, D_4^{35} 1·0340.

Jacger, *Z. anorg. allgem. Chem.*, 1917, 101, 140.

Kendall, Booge, *J. Am. Chem. Soc.*, 1916, 38, 1723.

Rüber, *Ber.*, 1915, 48, 827.

α-Methylcinnamic Acid (1-Benzylidenepropionic acid, 1-methyl-2-phenylacrylic acid)



$\text{C}_{10}\text{H}_{10}\text{O}_2$

MW, 162

(i) *Labile form*. Allo-α-methylcinnamic Acid. Cryst. from pet. ether. M.p. 91–2°. Sol. to 0·76% in pet. ether at 18°. Boiling HCl → stable form.

Aniline salt: needles from pet. ether– C_6H_6 . M.p. 74–74·5°.

Me ester: $\text{C}_{11}\text{H}_{12}\text{O}_2$. MW, 176. Oil. B.p. 112°/16 mm.

Amide: $\text{C}_{10}\text{H}_{11}\text{ON}$. MW, 161. Needles from EtOH.Aq. M.p. 137–8°.

(ii) *Stable form*.

Dimorphous. (i) Prisms from EtOH.Aq. M.p. 81–2°. Sol. to 2·27% in pet. ether at 20°.

(ii) Needles from pet. ether. M.p. 74°. Sol. to 87% in pet. ether at 20°.

Phenylhydrazine salt: cryst. from C_6H_6 –pet. ether. M.p. 64–5°.

Me ester: b.p. 137–8°/16 mm.

Et ester: $\text{C}_{12}\text{H}_{14}\text{O}_2$. MW, 190. B.p. 254–60°, 142–3°/12 mm. D_4^{20} 1·0321. n_D^{20} 1·5475.

Propyl ester: $\text{C}_{13}\text{H}_{16}\text{O}_2$. MW, 204. B.p. 162–5°/30 mm. D_{15}^{15} 1·027.

Isopropyl ester: b.p. 155–60°/20 mm. D_{15}^{15} 1·026.

Chloride: $\text{C}_{10}\text{H}_9\text{OCl}$. MW, 180·5. Needles from Et_2O . M.p. 50°. B.p. 126–7°/12 mm.

Amide: plates from H_2O . M.p. 128°. Spar. sol. EtOH, Et_2O .

Cohen, Whiteley, *J. Chem. Soc.*, 1901, 79, 1312.

Rupe, Busolt, *Ann.*, 1909, 369, 321.

Stoermer, Voht, *Ann.*, 1915, 409, 51.

β-Methylcinnamic Acid (2-Phenylcrotonic acid)



$\text{C}_{10}\text{H}_{10}\text{O}_2$

MW, 162

(i) *Cis*:- *Labile form*. Allo-β-methylcinnamic Acid.

Plates from CS_2 . M.p. 131·5°. B.p. 170–2°/14 mm. 100 gm. C_6H_6 dissolve 7·85 gm. at 21°. 100 gm. pet. ether dissolve 0·8 gm. at 21°. Conc. H_2SO_4 or boiling dil. HCl → *trans* form.

Me ester: $\text{C}_{11}\text{H}_{12}\text{O}_2$. MW, 176. Cryst. M.p. 26·5–27·5°. B.p. 135°/27 mm., 113·5°/8 mm. D_4^{25} 1·0373. n_D^{25} 1·528.

Amide: $\text{C}_{10}\text{H}_{11}\text{ON}$. MW, 161. Plates from ligroin. M.p. 94–5°. Very sol. EtOH, CHCl_3 . Sol. CS_2 , Et_2O . Spar. sol. pet. ether.

Anilide: $\text{C}_{16}\text{H}_{15}\text{ON}$. MW, 237. Needles from ligroin. M.p. 93°.

(ii) *Trans*:- *Stable form*.

Cryst. from ligroin. M.p. 98·5°. Very sol. CHCl_3 . Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin, CS_2 . Very spar. sol. H_2O .

Me ester: cryst. M.p. 29° (29–30°). B.p. 152°/30 mm., 129–129·5°/11 mm. D_4^{25} 1·0542. n_D^{25} 1·5444.

Et ester: $\text{C}_{12}\text{H}_{14}\text{O}_2$. MW, 190. B.p. 146–8°/16·5 mm., 138°/9 mm. D_4^{15} 1·0392. n_D^{15} 1·5456.

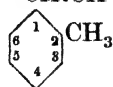
Amide: needles from ligroin. M.p. 119°.

Anilide: needles. M.p. 121°.

Stoermer, Grimm, Laage, *Ber.*, 1917, 50, 968.

Auwers, Eisenlohr, *J. prakt. Chem.*, 1911, 84, 86.

Auwers, *Ann.*, 1917, 413, 272.

o-Methylcinnamic Acid (2-o-Tolylacrylic acid) $C_{10}H_{10}O_2$ MW, 162

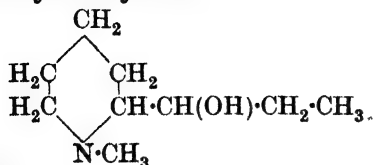
Cryst. from EtOH. M.p. 74–5°.

Et ester: $C_{12}H_{14}O_2$. MW, 190. B.p. 148.4°/12 mm. $D_4^{16.4}$ 1.0427. $n_D^{16.5}$ 1.556.Auwers, *Ann.*, 1917, 413, 265.**m-Methylcinnamic Acid** (2-m-Tolylacrylic acid).Needles from H_2O . M.p. 115°. Distils undecomp. Very sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. ligroin. Volatile in steam.*Nitrile*: $C_{10}H_9N$. MW, 143. B.p. 170°/30 mm. D_0 1.03.Fiquet, *Ann. chim.*, 1893, 29, 478.v. Miller, Rohde, *Ber.*, 1890, 23, 1899.**p-Methylcinnamic Acid** (2-p-Tolylacrylic acid).

Exists in two forms.

(i) *Higher melting form*.Needles from EtOH or C_6H_6 . M.p. 198–9°. Sol. hot H_2O , EtOH, C_6H_6 . Insol. ligroin.*Me ester*: $C_{11}H_{12}O_2$. MW, 176. Needles from EtOH.Aq. M.p. 57–8°. B.p. 164–5°/32 mm. $D_4^{55.9}$ 1.0270. $n_D^{55.6}$ 1.558.*Et ester*: b.p. 278°, 158–9°/17 mm. $D_4^{16.4}$ 1.0336. $n_D^{15.9}$ 1.5630.*Nitrile*: m.p. 69–80°.*Amide*: $C_{10}H_{11}ON$. MW, 161. Plates from $CHCl_3$. M.p. 189–90°.(ii) *Lower melting form*.Plates or needles. M.p. 75–6°. Very sol. EtOH, Et_2O , CS_2 , $CHCl_3$. Boiling dil. HCl → higher melting form.*Me ester*: b.p. 141–2°/23 mm.*Amide*: needles from C_6H_6 or EtOH.Aq. M.p. 116–116.5°.Stoermer, Grimm, Laage, *Ber.*, 1917, 50, 980.Auwers, *Ber.*, 1912, 45, 2781.Fiquet, *Ann. chim.*, 1893, 29, 483.**Methylcitraconic Acid.**

See Ethylmaleic Acid.

N-Methylconhydrine $C_9H_{19}ON$

MW, 157

d-.

B.p. 94–5°/11 mm. D_4^{20} 0.9400. n_D^{19} 1.47076.

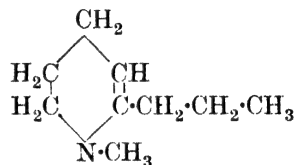
dl-.

Exists in two forms.

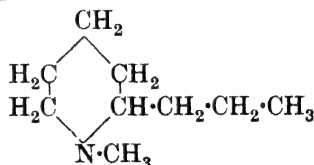
(α) B.p. 97–9°/16 mm.

Methiodide: prisms from MeOH. M.p. 178–9°.*Picrate*: cryst. from EtOH. M.p. 79–80°.

(β) B.p. 91–100°/15 mm.

Methiodide: prisms from EtOH. M.p. 174°.*Picrate*: plates from EtOH. M.p. 133–4°.Hoss, Grau, *Ann.*, 1925, 441, 101.Hess, *Ber.*, 1920, 53, 136.**N-Methyl-γ-coniceine** (N-Methyl-2-propyl-1 : 4 : 5 : 6-tetrahydropyridine) $C_9H_{17}N$

MW, 139

B.p. 182°, 73°/10 mm. $D_4^{7.8}$ 0.8783. $n_D^{7.8}$ 1.48364.*B.HCl*: cryst. + H_2O . M.p. 89°.*B.HAuCl_4*: cryst. from EtOH. M.p. 80°.*B.HClO_4*: cryst. from EtOH. M.p. 130–3°.*Picrate*: m.p. 170–1°.Lukeš, Smetáčková, *Chem. Abstracts*, 1934, 28, 5825.**N-Methylconiine** (Methylconicine, N-methyl-2-propylpiperidine) $C_9H_{19}N$

MW, 141

d-.

Occurs in hemlock. B.p. 173–4°/757 mm. Spar. sol. cold H_2O . D_4^{23} 0.8326, $D_4^{24.3}$ 0.8318. $n_D^{19.8}$ 1.45384. $[\alpha]_D^{25} + 82.4^\circ$.*B.HCl*: needles from EtOH. M.p. 192–3° (188–9°). $[\alpha]_D + 27.8^\circ$. Sublimes above 240°.*B.HAuCl_4*: yellow needles from H_2O . M.p. 78°. Spar. sol. hot H_2O .*B_2.H_2PtCl_6*: m.p. 158–60°. Very sol. H_2O . Insol. EtOH, Et_2O .

l-.

Occurs in hemlock. B.p. 175.6°/767 mm. D_2^{30} 0.8349. $[\alpha]_D^{30} - 81.9^\circ$.*B.HCl*: needles. M.p. 192–3° (191–2°). Sol. H_2O , EtOH. Insol. Et_2O . $[\alpha]_D - 27.2^\circ$.

B, HBr: needles from H_2O , plates from $EtOH$.
M.p. 189–90°. $[\alpha]_D^{25} - 21.1^\circ$ in H_2O .

B, HI: plates. M.p. 147°.

B, HAuCl₄: plates. M.p. 77–8°.

B₂, H₂PtCl₆: orange cryst. M.p. 153–4°. Sol. H_2O .

B, HCl, 3HgCl₂: cryst. M.p. 153–4°. Sol. H_2O .

Picrate: needles from H_2O . M.p. 121–2°. Spar. sol. H_2O .

dl.

B.p. 175–5°. $D_4^{16.5} 0.8389$. $n_D^{16.7} 1.45222$.

B, HCl: m.p. 165–7°.

B, HAuCl₄: cryst. from $EtOH.Aq.$ M.p. 90°.

B₂, H₂PtCl₆: cryst. from $EtOH.Aq.$ M.p. 197°.

Picrate: cryst. from H_2O . M.p. 112–14°.

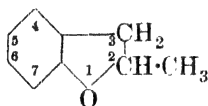
Hess, Eichet, *Ber.*, 1917, **50**, 1386.

Ahrens, *Ber.*, 1902, **35**, 1330.

Passon, *Ber.*, 1891, **24**, 1678.

Lukeš, Smetáčková, *Chem. Abstracts*, 1934, **28**, 5825.

2-Methylcoumaran



$C_9H_{10}O$

MW, 134

B.p. 197–8°, 93–4°/23 mm., 82–3°/14 mm.
 $D_4^{24} 1.032$, $D_4^{14} 1.0363$. $n_D^{25} 1.531$.

Auwers, *Ann.*, 1918, **415**, 150.

Adams, Rindfusz, *J. Am. Chem. Soc.*, 1919, **41**, 657, 660.

5-Methylcoumaran.

Liq. with peppermint-like odour. B.p. 210–11°, 88–9°/12 mm. $D_4^{19} 1.0463$. $n_D^{19} 1.54$.

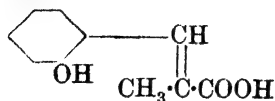
Stoermer, Göhl, *Ber.*, 1903, **36**, 2877.

Auwers, *Ann.*, 1918, **415**, 149.

Methylcoumaranone.

See 3-Hydroxy-methylcoumarone.

α -Methyl-*o*-coumaric Acid (2-Hydroxy- α -methylcinnamic acid, 1-salicylidenepropionic acid. Cf. α -Methyl-*o*-coumarinic Acid)



$C_{10}H_{10}O_3$

MW, 178

Needles from C_6H_6 . M.p. 138° decomp. Sol. $EtOH$, Et_2O , $CHCl_3$, $AcOH$. Mod. sol. C_6H_6 . Alk. sols fluoresce. Conc. $H_2SO_4 \rightarrow$ yellow sol.

Me ether: $C_{11}H_{12}O_3$. MW, 192. Prisms or needles from $EtOH$. M.p. 108°. Sol. $EtOH$, C_6H_6 . Spar. sol. H_2O , pet. ether. *Me ester*: $C_{12}H_{14}O_3$. MW, 206. Oil. B.p. 286°, 165°/13 mm. $D_4^{15.4} 1.1259$. $n_D^{15.2} 1.572$.

Et ether: $C_{12}H_{14}O_3$. MW, 206. Leaflets or prisms from $EtOH$. M.p. 133° (130–1°).

Perkin, *J. Chem. Soc.*, 1877, **31**, 415.

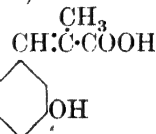
Moureu, *Bull. soc. chim.*, 1896, **15**, 1022.

Klages, *Ber.*, 1904, **37**, 3988.

Fries, Volk, *Ann.*, 1911, **379**, 98.

Auwers, *Ann.*, 1917, **413**, 269.

α -Methyl-*m*-coumaric Acid (3-Hydroxy- α -methylcinnamic acid)



$C_{10}H_{10}O_3$

MW, 178

Leaflets from H_2O . M.p. 130°.

Me ether: $C_{11}H_{12}O_3$. MW, 192. Needles from H_2O . M.p. 92–93.5°.

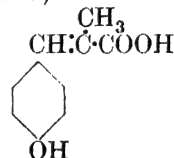
Et ether: $C_{12}H_{14}O_3$. MW, 206. Needles from $EtOH.Aq.$ M.p. 98° (80°). *Me ester*: $C_{13}H_{16}O_3$. MW, 220. Oil. B.p. 175–6°/14 mm.

Werner, *Ber.*, 1895, **28**, 2000.

Moureu, *Bull. soc. chim.*, 1896, **15**, 1022.

Klages, *Ber.*, 1904, **37**, 3989.

α -Methyl-*p*-coumaric Acid (4-Hydroxy- α -methylcinnamic acid)



$C_{10}H_{10}O_3$

MW, 178

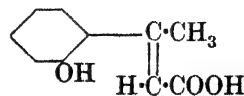
Me ether: 1-anisylidenepropionic acid. $C_{11}H_{12}O_3$. MW, 192. Leaflets from $EtOH$. M.p. 157° (154°). *Et ester*: $C_{13}H_{16}O_3$. MW, 220. B.p. 176–7°/15 mm. $D_4^{15.8} 1.0894$. $n_D^{15.8} 1.570$.

Perkin, *J. Chem. Soc.*, 1877, **31**, 411.

Wallach, Evans, *Ann.*, 1907, **357**, 76.

Auwers, Auffenberg, *Ber.*, 1919, **52**, 111.

β -Methyl-*o*-coumaric Acid (2-Hydroxy- β -methylcinnamic acid. Cf. β -Methyl-*o*-coumarinic Acid)



$C_{10}H_{10}O_3$

MW, 178

Needles from MeOH.Aq. M.p. 157° (154°). Sol. EtOH, Et₂O, AcOH. Spar. sol. C₆H₆.

Me ether: C₁₁H₁₂O₃. MW, 192. Leaflets and prisms from ligroin. M.p. 96.5° (95°). Sol. EtOH, Et₂O, CHCl₃. Mod sol. CS₂. Spar. sol. H₂O, C₆H₆, pet. ether. *Me ester*: C₁₂H₁₄O₃. MW, 206. B.p. 178-9°/28 mm., 172-3°/26 mm. D₄^{16.8} 1.1036. $n_D^{16.7}$ 1.549.

Fries, Volk, *Ann.*, 1911, **379**, 94.

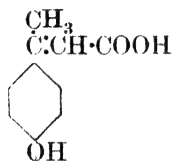
Stoermer, Grimm, Laage, *Ber.*, 1917, **50**, 960.

Lindenbaum, *Ber.*, 1917, **50**, 1273.

Auwers, *Ann.*, 1917, **413**, 277.

Stoermer, Sandow, *Ber.*, 1920, **53**, 1285.

β -Methyl-*p*-coumaric Acid (4-Hydroxy- β -methylcinnamic acid, 2-hydroxyphenylcrotonic acid)



C₁₀H₁₀O₃

MW, 178

Prisms from EtOH. M.p. 163°.

Me ether: C₁₁H₁₂O₃. MW, 192. Cryst. from EtOH. M.p. 156-5°. *Et ester*: C₁₃H₁₆O₃. MW, 220. Oil. B.p. 182-4°/14 mm.

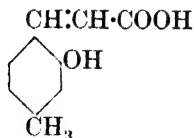
Et ether: C₁₂H₁₄O₃. MW, 206. Cryst. from EtOH. M.p. 122-3°. Sol. CS₂.

Schroeter, *Ber.*, 1908, **41**, 9.

Lindenbaum, *Ber.*, 1917, **50**, 1273.

Dixit, *J. Indian Chem. Soc.*, 1931, **8**, 792.

4-Methyl-*o*-coumaric Acid (2-Hydroxy-4-methylcinnamic acid)



C₁₀H₁₀O₃

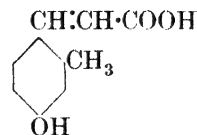
MW, 178

Needles from EtOH. Decomp. at 195°. Sol. Et₂O, AcOH. Mod. sol. EtOH, C₆H₆, CHCl₃. Sol. alkalis with green fluor.

Et ester: C₁₂H₁₄O₃. MW, 206. Leaflets from MeOH. M.p. 105°. Sol. AcOH, Et₂O. Mod. sol. EtOH, C₆H₆.

Fries, Klostermann, *Ann.*, 1908, **362**, 12.

2-Methyl-*p*-coumaric Acid (4-Hydroxy-2-methylcinnamic acid)



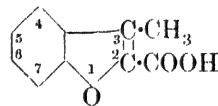
C₁₀H₁₀O₃

MW, 178

Me ether: C₁₁H₁₂O₃. MW, 192. Cryst. from AcOH. M.p. 185°. Sol. hot H₂O.

Perkin, Weizmann, *J. Chem. Soc.*, 1906, **89**, 1652.

3-Methylcoumarilic Acid (3-Methylcoumarone-2-carboxylic acid)



C₁₀H₈O₃

MW, 176

Needles from EtOH.Aq. M.p. 188°. Rapid heat. \rightarrow 3-methylcoumarone.

Me ester: C₁₁H₁₀O₃. MW, 190. Needles from hot H₂O. M.p. 70°.

Et ester: C₁₂H₁₂O₃. MW, 204. Plates from C₆H₆. M.p. 51°. B.p. 290°, 170°/17 mm. D₄⁵⁷ 1.1164. n_D^{56} 1.548.

Amide: C₁₀H₉O₂N. MW, 175. Needles from H₂O. M.p. 145°.

Peters, Simonis, *Ber.*, 1908, **41**, 832.

Hantzsch, *Ber.*, 1886, **19**, 1292.

Auwers, *Ann.*, 1915, **408**, 277.

6-Methylcoumarilic Acid (6-Methylcoumarone-2-carboxylic acid).

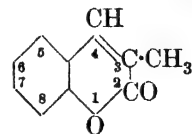
Needles from EtOH. M.p. 193-4°. Dist. with soda-lime \rightarrow 6-methylcoumarone.

Et ester: needles from pet. ether. M.p. 42-3°. B.p. 169-169.5°/14 mm. D₄⁴⁴ 1.1167. n_D^{44} 1.556.

Auwers, *Ann.*, 1915, **408**, 278.

Stoermer, *Ann.*, 1900, **312**, 282.

3-Methylcoumarin (α -Methylcoumarin)



C₁₀H₈O₂

MW, 160

Cryst. from EtOH. M.p. 91°. B.p. 292.5°. Sol. EtOH.

Oxime: needles from H₂O. M.p. 166°. *Acetyl deriv.*: cryst. from EtOH. M.p. 56°.

Phenylhydrazone: yellow needles from EtOH. M.p. 116°.

Aldringen, *Ber.*, 1891, **24**, 3460.
Fries, Volk, *Ann.*, 1911, **379**, 99.
Simonis, *Ber.*, 1915, **48**, 1584.

4-Methylcoumarin (β -Methylcoumarin).

Needles from H₂O or prisms from C₆H₆. M.p. 82°. Sol. warm conc. alkalis.

Picrate: yellow needles. M.p. 65°.

Fries, Volk, *Ann.*, 1911, **379**, 94 (*Note*).
Ghosh, *J. Chem. Soc.*, 1915, **107**, 1600.

5-Methylcoumarin.

Needles from H₂O or EtOH.Aq. M.p. (anhyd.) 65·8°, (+ $\frac{1}{4}$ C₆H₆) 56·5–56·7°. B.p. 173–4°/12 mm. Very sol. EtOH, Et₂O, C₆H₆. Spar. sol. ligroin.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 88.

6-Methylcoumarin.

Needles from EtOH. M.p. 74·6–75° (73–4°). B.p. 303°/725 mm., 174°/14 mm. Very sol. EtOH, Et₂O, C₆H₆. Spar. sol. pet. ether.

Mercurichloride: C₁₀H₈O₂.HgCl₂. Cryst. from Et₂O. M.p. 189–90°.

Platinichloride: yellow cryst. M.p. 65°.

Thompson, Edie, *J. Am. Chem. Soc.*, 1925, **47**, 2558.

See also previous reference.

7-Methylcoumarin.

Needles or plates from EtOH.Aq. M.p. 128°. B.p. 171·5°/11 mm. Very sol. EtOH, AcOH. Spar. sol. H₂O.

Oxime: needles from H₂O. M.p. 178°.

Phenylhydrazone: yellow needles from EtOH. M.p. 139°.

Posner, Hess, *Ber.*, 1913, **46**, 3826.

Clayton, *J. Chem. Soc.*, 1908, **93**, 527.

Fries, Klostermann, *Ber.*, 1906, **39**, 872.

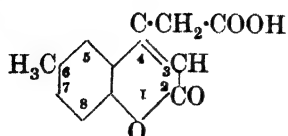
8-Methylcoumarin.

Needles from EtOH. M.p. 109–10°. B.p. 178°/20 mm. Very sol. hot EtOH, C₆H₆, Et₂O, CCl₄.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 79.

Posner, Hess, *Ber.*, 1913, **46**, 3822.

6-Methylcoumarin-4-acetic Acid



C₁₂H₁₀O₄

MW, 218

Needles from EtOH. M.p. 181°. At m.p. \rightarrow 4:6-dimethylcoumarin.

Et ester: C₁₄H₁₄O₄. MW, 246. Needles. M.p. 131°.

Anilide: cryst. from AcOH. M.p. 242–3°. Spar. sol. EtOH, C₆H₆.

Dey, *J. Chem. Soc.*, 1915, **107**, 1636.

7-Methylcoumarin-4-acetic Acid.

Cryst. M.p. 190° decomp. Sol. EtOH, AcOH. Spar. sol. Et₂O, C₆H₆. Above m.p. \rightarrow 4:7-dimethylcoumarin.

Et ester: needles from EtOH. M.p. 132°. Sol. EtOH, CHCl₃. Less sol. Me₂CO, AcOH. Spar. sol. pet. ether.

m-Tolyl ester: C₁₉H₁₆O₄. MW, 308. Needles from EtOH. M.p. 214°. Sol. Me₂CO. Less sol. EtOH, C₆H₆, AcOH. Spar. sol. pet. ether.

Anilide: needles from AcOH. M.p. 250°.

Fries, Volk, *Ann.*, 1911, **379**, 100.

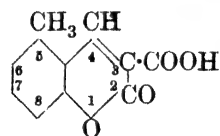
8-Methylcoumarin-4-acetic Acid.

Needles. M.p. 184° decomp. At m.p. \rightarrow 4:8-dimethylcoumarin.

Et ester: needles. M.p. 114°.

Dey, *J. Chem. Soc.*, 1915, **107**, 1636.

5-Methylcoumarin-3-carboxylic Acid



C₁₁H₈O₄

MW, 204

Needles from EtOH. M.p. 162–3°. Heat \rightarrow 5-methylcoumarin.

Et ester: C₁₃H₁₂O₄. MW, 232. Needles from 50% EtOH. M.p. 122–122·5°.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 85.

6-Methylcoumarin-3-carboxylic Acid.

Yellowish needles from EtOH. M.p. 166·8°. Sol. hot AcOH. Spar. sol. H₂O. Heat \rightarrow 6-methylcoumarin.

Et ester: plates from EtOH. M.p. 103–4°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. hot H₂O, pet. ether.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 88.

7-Methylcoumarin-3-carboxylic Acid.

Leaflets. M.p. 199–200°. Sol. hot AcOH. Spar. sol. hot H₂O, EtOH. Heat \rightarrow 7-methylcoumarin.

Et ester: leaflets from EtOH.Aq. M.p. 101–2°. Sol. hot EtOH. Insol. pet. ether.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 82.

8-Methylcoumarin-3-carboxylic Acid.

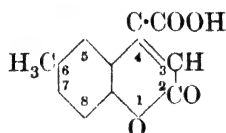
Needles from C₆H₆. M.p. 142–3°. B.p. 240–5°/18 mm. Sol. AcOH, CCl₄, hot C₆H₆. Spar. sol. H₂O, ligroin. Heat → 8-methylcoumarin.

Et ester: cryst. from C₆H₆-pet. ether. M.p. 81°. Sol. hot H₂O, EtOH, C₆H₆, CCl₄. Insol. cold H₂O, pet. ether.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 78.

Posner, Hess, *Ber.*, 1913, **46**, 3823.

6-Methylcoumarin-4-carboxylic Acid



C₁₁H₈O₄ MW, 204

M.p. 208–10°.

Et ester: C₁₃H₁₂O₄. MW, 232. Needles from AcOH. M.p. 155–7°.

Dey, *J. Chem. Soc.*, 1915, **107**, 1644.

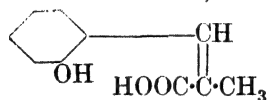
7-Methylcoumarin-4-carboxylic Acid.

M.p. 200°.

Et ester: yellow needles. M.p. 94–6°.

Dey, *J. Chem. Soc.*, 1915, **107**, 1645.

α-Methyl-o-coumarinic Acid (2-Hydroxy-α-methylcinnamic acid, 1-salicylidenepropionic acid. Cf. α-Methyl-o-coumaric Acid)

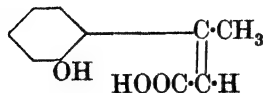


C₁₀H₁₀O₃ MW, 178

Me ether: C₁₁H₁₂O₃. MW, 192. Prisms from EtOH. M.p. 118°. Sol. EtOH. Mod. sol. hot pet. ether. *Me ester*: C₁₂H₁₄O₃. MW, 206. B.p. 274–5°. D₄¹⁵ 1.1112.

Perkin, *J. Chem. Soc.*, 1881, **39**, 429.

β-Methyl-o-coumarinic Acid (2-Hydroxy-β-methylcinnamic acid. Cf. β-Methyl-o-coumaric Acid)



C₁₀H₁₀O₃ MW, 178

Me ether: C₁₁H₁₂O₃. MW, 192. Cryst. from H₂O or ligroin. M.p. 123–4°. Sol. EtOH, CHCl₃. Mod. sol. C₆H₆. Spar. sol. Et₂O, CS₂,

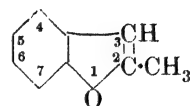
pet. ether. *Me ester*: C₁₂H₁₄O₃. MW, 206. B.p. 164°/28 mm., 157·5–158·5°/25 mm. D₄^{16·8} 1·0980. n_D¹⁷ 1·5335.

Stoermer, Grimm, Laage, *Ber.*, 1917, **50**, 978.

Auwers, *Ann.*, 1917, **413**, 277.

Stoermer, Sandow, *Ber.*, 1920, **53**, 1285.

2-Methylcoumarone



C₉H₈O MW, 132

B.p. 197·3–197·8°, 78°/12 mm. D₄^{14·4} 1·0588, D₄²⁰ 1·054. n_D 1·56145.

Picrate: cryst. M.p. 72–4°.

Auwers, *Ann.*, 1921, **422**, 151.

Stoermer, Barthelmess, *Ber.*, 1915, **48**, 67 (Note).

Claisen, *Ber.*, 1920, **53**, 324.

3-Methylcoumarone.

B.p. 196–7°/742 mm. D₄^{23·4} 1·0540. n_D²³ 1·553. Very volatile in steam.

Tetrameric form: yellowish powder. M.p. about 200°. Spar. sol. EtOH, Et₂O.

Hexameric form: amorph. M.p. below 100°. Very sol. Et₂O, CHCl₃.

Auwers, *Ann.*, 1915, **408**, 273.

Stoermer, *Ann.*, 1900, **312**, 275.

See also second reference above.

5-Methylcoumarone.

B.p. 83·5°/17 mm. D₄^{19·2} 1·0603. n_D¹⁹ 1·557.

Hexameric form: yellow powder. Very sol. CHCl₃, Et₂O. Spar. sol. EtOH, AcOH.

Auwers, *Ann.*, 1915, **408**, 274.

Stoermer, Barthelmess, *Ber.*, 1915, **48**, 65.

6-Methylcoumarone.

B.p. 192–3°.

Picrate: yellow needles. M.p. 67°.

Hexameric form: yellow powder. Very sol. CHCl₃, Et₂O. Spar. sol. EtOH, AcOH.

Octameric form: yellowish-brown powder. M.p. about 130°. Sol. Et₂O, CHCl₃, C₆H₆.

Stoermer, *Ber.*, 1897, **30**, 1706; *Ann.*, 1900, **312**, 282.

7-Methylcoumarone.

B.p. 190–1°. D₄¹⁹ 1·0490. n_D¹⁷ 1·5525.

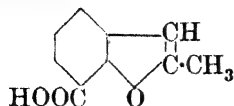
Picrate: yellow needles. M.p. 109°.

Hexameric form: brownish powder. M.p. about 100°.

See second reference above.

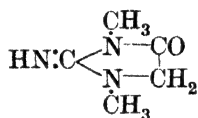
Methylcoumarone-2-carboxylic Acid.

See Methylcoumarilic Acid.

2-Methylcoumarone-7-carboxylic Acid $C_{10}H_8O_3$

MW, 176

Cryst. from EtOH.Aq. M.p. 152°. Sublimes.

Adams, Rindfusz, *J. Am. Chem. Soc.*, 1919, **41**, 664.Claisen, *Ber.*, 1920, **53**, 324.**3-Methylcreatinine** $C_5H_9ON_3$

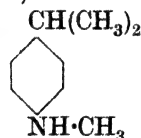
MW, 127

Needles. Very hygroscopic. Reacts strongly alkaline. Picric acid + NaOH \rightarrow red col. B, HCl : needles. Very sol. H_2O . B, HI : needles from EtOH. M.p. 212°. B, H_2AuCl_4 : yellow needles or prisms. M.p. 176°.

Picrate: yellow needles. M.p. 183°.

Korndörfer, *Arch. Pharm.*, 1904, **242**, 641.**Methylcrotonic Acid.**

See Angelic Acid, Tiglic Acid, and 2:2-Dimethylacrylic Acid.

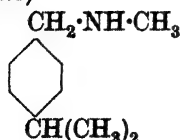
N-Methyl-p-cumidine (*N-Methyl-4-isopropylaniline*, 4-methylaminoisopropylbenzene, 4-methylaminocumene) $C_{10}H_{15}N$

MW, 149

Oil. B.p. 111-12°/11 mm.

 B, HCl : cryst. M.p. 128°. Sol. H_2O . B_2, H_2PtCl_6 : cryst. from H_2O + trace HCl. M.p. 192°.

Picrate: cryst. from MeOH. M.p. 147°.

Sachs, Weigort, *Ber.*, 1907, **40**, 4359.**N-Methylcuminyllamine** (*N-Methyl-p-isopropylbenzylamine*) $C_{11}H_{17}N$

MW, 163

B.p. 121°/23 mm. Strong base.

 B, HCl : needles from H_2O . M.p. 165°. Sol. H_2O , EtOH. Insol. Et_2O . B, HBr : plates from H_2O . M.p. 178°. Insol. Et_2O . B, H_2AuCl_4 : yellow needles. M.p. 141°. B_2, H_2PtCl_6 : yellow needles from H_2O . M.p. 193°.

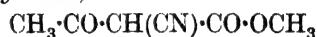
Picrate: yellow needles from EtOH. M.p. 137°.

Schwabbauer, *Ber.*, 1902, **35**, 413.**Methyl cumyl Ketone.**

See Isopropylacetophenone.

Methyl cyanide.

See Acetonitrile.

Methyl 1-cyanoacetoacetate (1-Cyanoacetoacetic methyl ester) $C_6H_7O_3N$

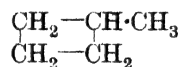
MW, 141

Needles. M.p. 46-7°. Insol. H_2O . Sol. EtOH, Et_2O . Forms Na, Ca, and Ba derivs.Guinchant, *Ann. chim.*, 1918, **9**, 80.**1-Methyl-1-cyanobutyric Acid.**

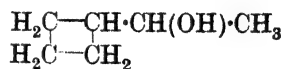
See under Methyllethylmalonic Acid.

Methylcycylene.

See under Tricycylene.

Methylcyclobutane C_5H_{10}

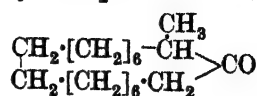
MW, 70

B.p. 35-6°/753 mm. D_4^{20} 0.7135, D_4^{20} 0.6931. n_D^{15} 1.386, n_D^{20} 1.3836.Filipow, *J. prakt. Chem.*, 1916, **93**, 177.Demjanow, Dojarenko, *Chem. Zentr.*, 1913, I, 2027.**Methylcyclobutylcarbinol** (α -Hydroxyethylcyclobutane) $C_8H_{12}O$

MW, 100

Liq. with peppermint odour. B.p. 144-5°. D_4^{20} 0.9075, D_4^{20} 0.8997. n_D^{15} 1.14451.Perkin, Sinclair, *J. Chem. Soc.*, 1892, **61**, 50.**Methyl cyclobutyl Ketone.**

See Acetocyclobutane.

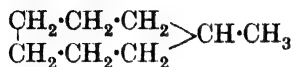
2-Methylcycloheptadecanone $C_{18}H_{34}O$

MW, 266

Liq. with musk-like odour. B.p. $150^{\circ}/0.5$ mm.
Semicarbazone: cryst. from MeOH. M.p. $142-3^{\circ}$.

Ruzicka, Schinz, Pfeiffer, *Helv. Chim. Acta*, 1928, 11, 698.

Methylcycloheptane (*Methylsuberane*)



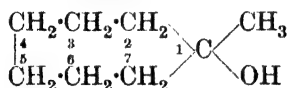
C_8H_{16}

MW, 112

B.p. 134° . D_4^{18} 0.9981. n_D^{18} 1.439. Heat of comb. C_v 1254.8 Cal.

Zelinsky, *Bull. soc. chim.*, 1907, 2, 1319.
 Subow, *Chem. Zentr.*, 1913, I, 2026.

1-Methylcycloheptanol



$\text{C}_8\text{H}_{16}\text{O}$

MW, 128

B.p. 183.5° . D_4^{21} 0.9392 (D^{22} 0.9285). n_D^{22} 1.4677. $\text{KHSO}_4 \rightarrow$ 1-methylcycloheptene.

Zelinsky, *Bull. soc. chim.*, 1907, 2, 1319.
 Wallach, *Ann.*, 1906, 345, 140.

2-Methylcycloheptanol.

Cis:

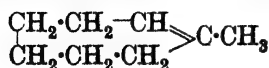
B.p. $191^{\circ}/753$ mm. D^{15} 0.9492. n_D^{15} 1.4762.
Acid phthalate: cryst. from C_6H_6 -pet. ether. M.p. 86° .
Phenylurethane: cryst. from EtOH. M.p. $40-1^{\circ}$.

Trans:

B.p. $194^{\circ}/768$ mm. D^{15} 0.9422. n_D^{15} 1.4740.
Acid phthalate: cryst. from C_6H_6 -pet. ether. M.p. 98° .
Phenylurethane: cryst. from EtOH. M.p. $59-60^{\circ}$.

Godchot, Cauquil, *Compt. rend.*, 1930, 190, 642.

1-Methylcycloheptene (1-Methylsuberene)



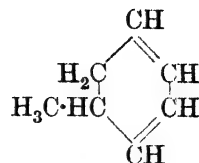
C_8H_{14}

MW, 110

B.p. $137.5-138.5^{\circ}$. D^{20} 0.824. n_D^{20} 1.4581.
 Ox. \rightarrow 5-aceto-*n*-caproic acid.
Nitrosochloride: m.p. 106° .

Wallach, *Ann.*, 1906, 345, 140.

5-Methyl- $\Delta^{1,3}$ -cyclohexadiene ($\Delta^{2,4}$ -Di-hydrotoluene)



C_7H_{10}

MW, 94

B.p. $100.5-101.5^{\circ}/762$ mm. $D_4^{22.5}$ 0.8252. $n_D^{22.5}$ 1.4662. Oxidises readily in air.

Harries, *Ann.*, 1913, 395, 255.

Several other methylcyclohexadienes of unknown constitution are described in the literature.

(i) B.p. $110^{\circ}/741$ mm. D^{20} 0.8292. n_D^{20} 1.4710.
 (ii) B.p. $105-6^{\circ}$. D_4^{20} 0.8274. n_D^{20} 1.4680.

Zelinsky, Gorsky, *Ber.*, 1908, 41, 2485, 2630.

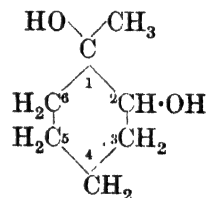
(iii) B.p. 110° . D_4^{20} 0.8354. n_D^{20} 1.4763.

Harries, *Ber.*, 1908, 41, 1698.

(iv) B.p. $108-10^{\circ}$. D_4^{20} 0.7970. n_D^{20} 1.4444.

Pictet, Ramseier, Kaiser, *Compt. rend.*, 1916, 163, 359.

1-Methylcyclohexandiol-1 : 2 (1-Methyl-hexahydrocatechol, 1 : 2-dihydroxyhexahydrotoluene)



$\text{C}_7\text{H}_{14}\text{O}_2$

MW, 130

Cis:

Cryst. from Et_2O . M.p. 67° . Forms cryst. salt with boric acid and KOH.

Acetone comp.: b.p. $183.5-184^{\circ}$. D_4^{16} 0.9701. n_D^{16} 1.4496.

Trans:

Prisms from CHCl_3 -pet. ether. M.p. 84° .

Nametkin, Jarzeff, *Ber.*, 1923, 56, 1803.

Böeseken, *ibid.*, 2409.

4-Methylcyclohexandiol-1 : 2 (4-Methyl-hexahydrocatechol, hexahydrohomocatechol, 3 : 4-dihydroxyhexahydrotoluene).

Cis:

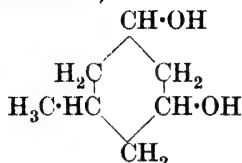
Rhomboheda from Et_2O -pet. ether. M.p. $63-4^{\circ}$. B.p. $131-2^{\circ}/12$ mm.

Trans :

Needles from Et₂O-pet. ether. M.p. 35-7°. B.p. 125-125.5°/15 mm.

Nametkin, Brüssoff, *Ber.*, 1923, 56, 1808.

5-Methylcyclohexandiol-1 : 3 (3 : 5-Dihydroxyhexahydrotoluene)



C₇H₁₄O₂

MW, 130

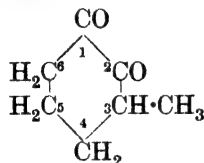
Exists in two forms.

(i) Needles from AcOEt. M.p. 75°. Sol. cold H₂O, EtOH, warm Me₂CO, CHCl₃, AcOEt.

(ii) Needles from AcOEt. M.p. 143.5°. Less sol. Et₂O than (i).

Crossley, Renouf, *J. Chem. Soc.*, 1915, 107, 605

3-Methylcyclohexandione-1 : 2



C₇H₁₀O₂

MW, 126

Cryst. from pet. ether. M.p. 64-5° (62-3°). Sol. H₂O. Distils undecomp. FeCl₃ → violet col. Reduces NH₃.AgNO₃, Fehling's, and Au sols.

Dioxime : cryst. M.p. 166°.

Monosemicarbazone : needles from EtOH. M.p. 174-5°.

Monophenylhydrazone : sinters at 88°, m.p. 131°.

Mono-p-tolylhydrazone : exists in two forms.

(i) M.p. 117-18°. (ii) M.p. 91-3°.

Monoacetylphenylhydrazone : m.p. 137-40°.

Monoacetyl-p-tolylhydrazone : m.p. 117-20°.

Wallach, *Ann.*, 1918, 414, 314.

Sen, Ghosh, *Chem. Abstracts*, 1928, 22, 1145.

4-Methylcyclohexandione-1 : 2.

Needles. M.p. 35-6°. B.p. 85°/12 mm. Sol. H₂O and most org. solvents. Alc. FeCl₃ → red col.

Monoxime : cryst. M.p. 158-9°.

Dioxime : cryst. from MeOH. M.p. 181° (168°). Sol. EtOH, Et₂O, AcOEt.

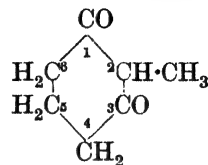
Kötz, Nussbaum, Lakens, *J. prakt. Chem.*, 1914, 90, 369.

5-Methylcyclohexandione-1 : 2.

Dioxime : cryst. M.p. 185°.

Wallach, *Chem. Abstracts*, 1925, 19, 487.

2-Methylcyclohexandione-1 : 3



C₇H₁₀O₂

MW, 126

Cryst. M.p. 210° decomp.

Dioxime : needles. M.p. 220°. Spar. sol. H₂O, EtOH.

Blaise, Maire, *Compt. rend.*, 1907, 144, 573.

4-Methylcyclohexandione-1 : 3.

Oil.

Di-semicarbazone : amorph. M.p. 224-5° decomp. Insol. usual solvents.

Gilling, *J. Chem. Soc.*, 1913, 103, 2034.

5-Methylcyclohexandione-1 : 3.

Cryst. from AcOEt. M.p. 128° (122°). Sol. hot H₂O, EtOH, CHCl₃. Spar. sol. Et₂O, ligroin. Aq. sol. reacts acid. $k = 0.57 \times 10^{-5}$ at 25°. FeCl₃ → wine-red col.

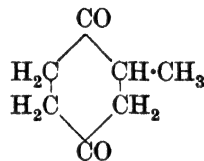
Dioxime : prisms from H₂O, needles from EtOH. M.p. 155-7°. Spar. sol. cold H₂O.

Di-semicarbazone : amorph. Decomp. at 225°. Insol. usual solvents.

Vorländer, Kalkow, *Ber.*, 1897, 30, 1801.

Crossley, Renouf, *J. Chem. Soc.*, 1915, 107, 605.

Methylcyclohexandione-1 : 4



C₇H₁₀O₂

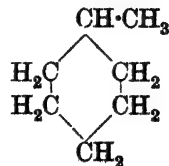
MW, 126

Plates from ligroin. M.p. 50°. Sol. H₂O. Sublimes in vacuo. No col. with FeCl₃.

Di-semicarbazone : cryst. M.p. 240° decomp. Insol. most solvents.

Helferich, *Ber.*, 1921, 54, 161.

Methylcyclohexane (Hexahydrotoluene)



C₇H₁₄

MW, 98

Occurs in various petroleum oils. B.p. 100-4°. $D_4^{15.5}$ 0.7773, D_4^{20} 0.7695. n_D^{15} 1.4253.

Auwers, Eisenlohr, *Z. physik. Chem.*, 1913, **83**, 432.

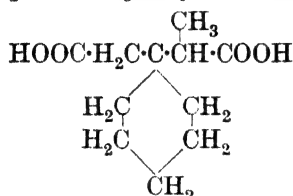
Chavanne, Simon, *Compt. rend.*, 1919, **169**, 286.

Skita, Meyer, *Ber.*, 1912, **45**, 3592.

Methylcyclohexane-carboxylic Acid.

See Hexahydrotoluic Acid.

α -Methylcyclohexane-1 : 1-diacetic Acid
(1-Methyl-2-pentamethyleneglutaric acid)



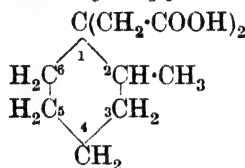
$\text{C}_{11}\text{H}_{18}\text{O}_4$ MW, 214

Prisms from EtOH.Aq. or C_6H_6 -pet. ether. M.p. 144-5°.

Anhydride: needles from pet. ether. M.p. 62°.

Kon, Thorpe, *J. Chem. Soc.*, 1922, **121**, 1801.

2-Methylcyclohexane-1 : 1-diacetic Acid
(2-[2-Methylpentamethylene]-glutaric acid)



$\text{C}_{11}\text{H}_{18}\text{O}_4$ MW, 214

Plates from EtOH.Aq. or needles from C_6H_6 . M.p. 148°. Spar. sol. C_6H_6 .

Kon, Thorpe, *J. Chem. Soc.*, 1919, **115**, 694.

3-Methylcyclohexane-1 : 1-diacetic Acid
(2-[3-Methylpentamethylene]-glutaric acid).

Needles from dil. EtOH or C_6H_6 . M.p. 143°.

Di-Et ester: $\text{C}_{15}\text{H}_{26}\text{O}_4$. MW, 270. B.p. 174°/22 mm.

Anhydride: $\text{C}_{22}\text{H}_{34}\text{O}_7$. MW, 410. Needles from pet. ether. M.p. 19°. B.p. 212°/20 mm.

Mono-anilide: $\text{C}_{17}\text{H}_{28}\text{O}_3\text{N}$. MW, 289. Exists in two forms. (i) Plates from EtOH. M.p. 172°. (ii) Needles or plates. M.p. 141°.

Anil: needles from EtOH. M.p. 137°.

Thorpe, Wood, *J. Chem. Soc.*, 1913, **103**, 1597.

Desai, *J. Chem. Soc.*, 1932, 1060.

Dist. of Org. Comp.—II.

4-Methylcyclohexane-1 : 1-diacetic Acid
(2-[4-Methylpentamethylene]-glutaric acid).

Needles from EtOH.Aq. M.p. 158°. Sol. C_6H_6 .

Di-Et ester: b.p. 178°/24 mm.

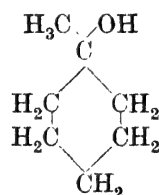
Anhydride: plates from pet. ether. M.p. 53°. B.p. 212°/50 mm.

Mono-anilide: exists in two forms. (i) Needles from EtOH. M.p. 184°. (ii) Needles from EtOH. M.p. 148°.

Anil: needles from EtOH.Aq. M.p. 140°.

See previous references.

1-Methylcyclohexanol

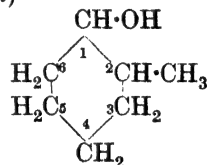


$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

Cryst. M.p. 24-5°. B.p. 155°, 56.5°/10 mm. D_4^{20} 0.9249. n_D^{20} 1.45874.

Auwers, Hinterseber, Treppmann, *Ann.*, 1915, **410**, 274.

2-Methylcyclohexanol (*Hexahydro-o-cresol*, *2-methylhexalin*)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

Cis:

M.p. -9.5 to -9.2°. B.p. 165°. D_4^{20} 0.9337. n_D^{20} 1.4640.

p-Nitrobenzoyl: m.p. 53° (55-6°).

3 : 5-Dinitrobenzoyl: m.p. 99-100°.

Acid phthalate: m.p. 104°.

Phenylurethane: m.p. 93-4° (90-91°).

Trans:

M.p. -21.2° to -20.5°. B.p. 166.5°. D_4^{20} 0.9238. n_D^{20} 1.4611.

p-Nitrobenzoyl: m.p. 65°.

3 : 5-Dinitrobenzoyl: m.p. 114-15°.

Acid phthalate: m.p. 124-5°.

Neutral oxalate: leaflets from pet. ether. M.p. 61°.

Phenylurethane: m.p. 105°.

Skita, Faust, *Ber.*, 1931, **64**, 2884.

Hückel, Hagenguth, *Ber.*, 1931, **64**, 2892.

Vavon, Perlin, Horeau, *Bull. soc. chim.*, 1932, **51**, 644.

3-Methylcyclohexanol

3-Methylcyclohexanol (*Hexahydro-m-cresol*, 3-methylhexalin).

Cis :

B.p. 173–4°. $D_4^{21.8}$ 0.9173. $n_D^{21.8}$ 1.45403.

3 : 5-Dinitrobenzoyl : m.p. 91–2°.

Phenylurethane : m.p. 87–8°.

Trans :

B.p. 174–5°/762 mm. $D_4^{21.8}$ 0.9145. $n_D^{21.8}$ 1.45497.

3 : 5-Dinitrobenzoyl : m.p. 97–8°.

Phenylurethane : m.p. 93–4°.

Skita, Faust, *Ber.*, 1931, **64**, 2878.

4-Methylcyclohexanol (*Hexahydro-p-cresol*, 4-methylhexalin).

Cis :

B.p. 173–4°/750 mm. $D_4^{21.6}$ 0.9129. $n_D^{21.6}$ 1.45427.

3 : 5-Dinitrobenzoyl : m.p. 134°.

Phenylurethane : m.p. 118–19°.

Trans :

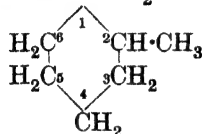
B.p. 173–174.5°/745 mm. $D_4^{20.7}$ 0.9118. $n_D^{20.7}$ 1.45307.

3 : 5-Dinitrobenzoyl : m.p. 139–140°.

Phenylurethane : m.p. 124–5°.

See above reference.

2-Methylcyclohexanol-1-acetic Acid (1-Hydroxy-2-methylcyclohexyl-acetic acid)



$\text{C}_9\text{H}_{16}\text{O}_3$

MW, 172

Cryst. from C_6H_6 -ligroin. M.p. 67–8°.

Et ester : $\text{C}_{11}\text{H}_{20}\text{O}_3$. MW, 200. B.p. 131–6°/18 mm.

Wallach, Beschke, *Ann.*, 1906, **347**, 337.

Auwers, Ellinger, *Ann.*, 1912, **387**, 230.

3-Methylcyclohexanol-1-acetic Acid (1-Hydroxy-3-methylcyclohexyl-acetic acid).

Active form :

Et ester : $\text{C}_{11}\text{H}_{20}\text{O}_3$. MW, 200. B.p. 126–8°/15 mm. D_4^{15} 1.004. $[\alpha]_D + 1^\circ 44'$.

Inactive form :

Me ester : $\text{C}_{10}\text{H}_{18}\text{O}_3$. MW, 186. B.p. 120–5°/23 mm.

Et ester : b.p. 126–8°/15 mm. D_4^{15} 1.004.

v. Braun, Teuffert, *Ber.*, 1925, **58**, 2210.

4-Methylcyclohexanol-1-acetic Acid (1-Hydroxy-4-methylcyclohexyl-acetic acid).

Exists in two forms.

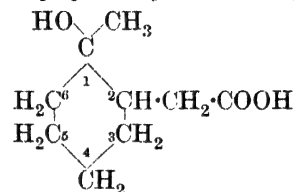
3-Methylcyclohexanol-1-carboxylic Acid

- (i) Rhombohedra from EtOH.Aq. M.p. 141°. Sol. most org. solvents. Spar. sol. H_2O , ligroin.
(ii) Prisms + H_2O from H_2O . M.p. 48–50°, anhyd. 89–90°. Very sol. most org. solvents. Sol. H_2O . Spar. sol. ligroin.

Marckwald, *Meth. Ber.*, 1906, **39**, 1174.

Wallach, *Ann.*, 1909, **365**, 265.

1-Methylcyclohexanol-2-acetic Acid (2-Hydroxy-2-methylcyclohexyl-acetic acid)



$\text{C}_9\text{H}_{16}\text{O}_3$

MW, 172

Cryst. from pet. ether. M.p. 107°.

Lactone : $\text{C}_9\text{H}_{14}\text{O}_2$. MW, 154. B.p. 136–7°/13 mm. D_4^{19} 1.0680. n_D^{19} 1.4764.

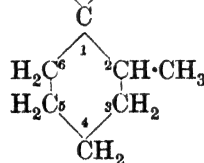
v. Braun, Münch, *Ann.*, 1928, **465**, 65.

5-Methylcyclohexanol-2-acetic Acid (2-Hydroxy-4-methylcyclohexyl-acetic acid).

Lactone : $\text{C}_9\text{H}_{14}\text{O}_2$. MW, 154. B.p. 143–9°/16 mm.

Kötz, Hoffmann, *J. prakt. Chem.*, 1925, **110**, 101.

2-Methylcyclohexanol-1-carboxylic Acid (2-Hydroxyhexahydro-o-toluic acid)



$\text{C}_8\text{H}_{14}\text{O}_3$

MW, 158

Cryst. from C_6H_6 . M.p. 109°. Sol. 50 parts H_2O at 19°. Sol. Me_2CO , Et_2O . Less sol. C_6H_6 , pet. ether.

Et ether : $\text{C}_{10}\text{H}_{18}\text{O}_3$. MW, 186. Plates from formic acid. M.p. 81°. Sol. Me_2CO , pet. ether. Very spar. sol. cold H_2O .

Sernow, *Ber.*, 1899, **32**, 1169.

3-Methylcyclohexanol-1-carboxylic Acid (3-Hydroxyhexahydro-m-toluic acid).

Exists in two forms. (i) Plates from H_2O . M.p. 103–4°. B.p. 170–5°/20 mm. decomp. Sol. hot H_2O . (ii) B.p. 260–70°/723 mm. decomp., 163–6°/12 mm.

Amide : $\text{C}_8\text{H}_{15}\text{O}_2\text{N}$. MW, 157. Leaflets

4-Methylcyclohexanol-1-carboxylic Acid

from C_6H_6 . M.p. $120-1^\circ$. Benzoyl: cryst. M.p. $135-6^\circ$.

Nitrile: $C_8H_{13}ON$. MW, 139. Cryst. from hot pet. ether. M.p. $63-4^\circ$. Sublimes easily. Benzoyl: cryst. M.p. $125-6^\circ$. Spar. sol. Et_2O .

Perkin, Tattersall, *J. Chem. Soc.*, 1905, **87**, 1098.

Markownikow, Smirnow, *Chem. Zentr.*, 1907, I, 1407.

Aloy, Rabaut, *Compt. rend.*, 1913, **156**, 1548.

4-Methylcyclohexanol-1-carboxylic Acid (4-Hydroxyhexahydro-p-toluic acid).

Exists in three forms. (i) Plates from H_2O . M.p. $130-2^\circ$. Sol. $EtOH$, Et_2O . Spar. sol. cold H_2O . (ii) Cryst. from H_2O . M.p. 115° . Sol. H_2O , $EtOH$, Me_2CO , Et_2O . Less sol. C_6H_6 , ligroin. (iii) Cryst. M.p. $80-1^\circ$.

Amide: benzoyl, cryst. M.p. 122° .

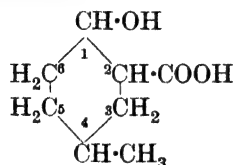
Nitrile: benzoyl, cryst. M.p. 86° .

Perkin, *J. Chem. Soc.*, 1906, **89**, 835.

Skita, Levi, *Ber.*, 1908, **41**, 2933.

See also last reference above.

4-Methylcyclohexanol-2-carboxylic Acid (4-Hydroxyhexahydro-m-toluic acid)



$C_8H_{14}O_3$

MW, 158

Cryst. from Et_2O . M.p. 114° . Sol. H_2O , $EtOH$. Spar. sol. cold Et_2O .

Et ester: $C_{10}H_{18}O_3$. MW, 186. B.p. $132-4^\circ/17$ mm.

Gardner, Perkin, Watson, *J. Chem. Soc.*, 1910, **97**, 1769.

5-Methylcyclohexanol-2-carboxylic Acid (3-Hydroxyhexahydro-p-toluic acid).

*d*l-.

Cryst. from Et_2O . M.p. $129-30^\circ$. B.p. $185-90^\circ/22$ mm.

Et ester: b.p. $135^\circ/20$ mm. D_{20}^{20} 1.026. n_D 1.458. $[\alpha]_D +5.9^\circ$ in $AcOEt$.

dl-.

Prisms from Et_2O . M.p. $130-1^\circ$. Sol. $EtOH$. Less sol. H_2O , C_6H_6 , $CHCl_3$.

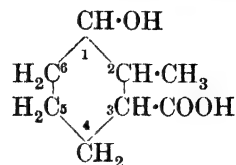
See previous reference and also

Chou, Perkin, *J. Chem. Soc.*, 1911, **99**, 532.

659

6-Methylcyclohexanol-3-carboxylic Acid

2-Methylcyclohexanol-3-carboxylic Acid (6-Hydroxyhexahydro-o-toluic acid)



$C_8H_{14}O_3$

MW, 158

Cis :

Exists in two forms. (i) Cryst. from Et_2O . M.p. $150-1^\circ$. Sol. H_2O . Spar. sol. dry Et_2O . (ii) Cryst. from H_2O . M.p. about $128-30^\circ$.

Trans :

Prisms from Et_2O . M.p. $170-2^\circ$. B.p. $188^\circ/15$ mm. Sol. H_2O . Spar. sol. cold Et_2O .

Baudisch, Perkin, *J. Chem. Soc.*, 1909, **95**, 1887.

4-Methylcyclohexanol-3-carboxylic Acid (4-Hydroxyhexahydro-o-toluic acid).

Cis :

Exists in two forms. (i) Prisms from H_2O or Et_2O . M.p. $190-1^\circ$ decomp. Spar. sol. H_2O . (ii) Cryst. from H_2O . M.p. $126-8^\circ$.

Trans :

Exists in two forms. (i) Cryst. from H_2O . M.p. $163-5^\circ$. Spar. sol. $EtOH$. Decomp. about $220-5^\circ$. (ii) Cryst. from Et_2O or H_2O . M.p. $122-3^\circ$. Sol. H_2O . Less sol. Et_2O .

Baudisch, Hibbert, Perkin, *J. Chem. Soc.*, 1909, **95**, 1878.

5-Methylcyclohexanol-3-carboxylic Acid (5-Hydroxyhexahydro-m-toluic acid).

Cis :

Plates from Et_2O . M.p. $138-9^\circ$. Very sol. H_2O . Spar. sol. Et_2O .

Trans :

Cryst. from H_2O . M.p. $138-9^\circ$. Sol. H_2O . Spar. sol. Et_2O .

Meldrum, Perkin, *J. Chem. Soc.*, 1909, **95**, 1898.

6-Methylcyclohexanol-3-carboxylic Acid (2-Hydroxyhexahydro-p-toluic acid).

Active form :

Cryst. from $AcOEt$ -ligroin. M.p. 153° . Sol. H_2O , $EtOH$, Et_2O .

dl-.

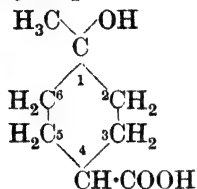
Cis : Prisms from H_2O . M.p. $130-2^\circ$. Sol. H_2O , Et_2O .

1-Methylcyclohexanol-4-carboxylic Acid

Trans: Plates from H_2O . M.p. 160–1°. Spar. sol. H_2O , Et_2O .

Semmler, *Ber.*, 1903, **36**, 767.

Meldrum, Perkin, *J. Chem. Soc.*, 1908, **94**, 1421.

1-Methylcyclohexanol-4-carboxylic Acid
(1-Hydroxyhexahydro-p-toluic acid)

$C_8H_{14}O_3$ MW, 158.

Plates from H_2O . M.p. 153°. Sol. H_2O . Distills in vacuo.

Stephan, Helle, *Ber.*, 1902, **35**, 2158.

Perkin, *J. Chem. Soc.*, 1904, **85**, 660.

2-Methylcyclohexanol-4-carboxylic Acid
(6-Hydroxyhexahydro-m-toluic acid).

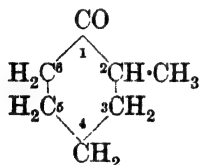
Cis:

Needles from H_2O . M.p. about 140–1°. Spar. sol. H_2O .

Trans:

Needles from H_2O , cryst. from Et_2O . M.p. 115–17°.

Fisher, Perkin, *J. Chem. Soc.*, 1908, **93**, 1883.

2-Methylcyclohexanone (2-Ketohexahydro-toluene)

$C_7H_{12}O$ MW, 112

Oil. B.p. 166°. D_4^{20} 0.9250. n_D^{20} 1.4483.

Oxime: cryst. M.p. 43°. B.p. 112–13°/13 mm.

Semicarbazone: cryst. M.p. 191°.

Phenylhydrazone: oil. B.p. 220°/35–40 mm.

Skita, *Ber.*, 1923, **56**, 1016.

3-Methylcyclohexanone (3-Ketohexahydro-toluene).

d.

B.p. 169°. D_4^{21} 0.915. n_D^{21} 1.4456. $[\alpha]_D^{15} + 13.38^\circ$.

Oxime: cryst. M.p. 43–4°. B.p. 216–17°, 110°/18 mm. $[\alpha]_D^{23} - 42.07^\circ$ in $MeOH.Aq$.

Benzoyl deriv.: (i) m.p. 96–7°. $[\alpha]_D^{23} + 20^\circ$.

5-Methylcyclohexanone-2-acetic Acid

(ii) M.p. 82–3°. $[\alpha]_D^{21} - 86^\circ$: both derivs. regenerate original oxime with KOH.

Azine: yellow oil. B.p. 230°/124 mm., 187°/30 mm. $[\alpha]_D - 51.22^\circ$.

Semioxamazone: needles from Et_2O . M.p. 153–4°.

Semicarbazone: plates from $MeOH$. M.p. 180°.

Hydrazone: oil. B.p. 154°/71 mm. D_4^{17} 0.9603. n_D^{17} 1.5043. $[\alpha]_D - 35.94^\circ$.

dl.

B.p. 168°, 60–60.2°/15 mm. D_4^{20} 0.9136°. n_D^{20} 1.4430.

Oxime: oil. *Benzoyl deriv.*: (i) M.p. 105–6°.

(ii) M.p. 70–2°: both derivs. give an oxime, m.p. 18–24°, with alkalis.

Semicarbazone: plates from $MeOH$. M.p. 178–9°.

Phenylsemicarbazone: cryst. M.p. 186°.

Phenylhydrazone: cryst. from $EtOH.Aq$. M.p. 94°.

Picrate: plates. M.p. 155°.

m-Nitrophenylhydrazone: cryst. from $EtOH$. M.p. 90°.

Dibenzylidene deriv.: cryst. M.p. 118°.

Wallach, *Ber.*, 1899, **32**, 3338; *Ann.*, 1896, **289**, 339; 1904, **332**, 338.

Haworth, Perkin, Wallach, *J. Chem. Soc.*, 1913, **103**, 1239.

Skita, *Ber.*, 1923, **56**, 1016.

Borsche, *Ann.*, 1908, **359**, 61, 68.

4-Methylcyclohexanone (4-Ketohexahydro-toluene).

B.p. 170.5°. D_4^{20} 0.9138. n_D^{20} 1.4439.

Oxime: cryst. M.p. 37–9° (36°). B.p. 114°/14 mm.

Semicarbazone: prisms from $MeOH$. M.p. 197°.

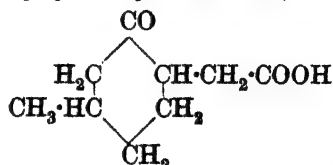
o-Nitrophenylhydrazone: crimson prisms from $EtOH$. M.p. 59°.

m-Nitrophenylhydrazone: orange-red prisms from $EtOH$. M.p. 80–1°.

p-Nitrophenylhydrazone: yellow needles from $EtOH$. M.p. 128.5°.

Skita, *Ber.*, 1923, **56**, 1016.

Plant, Rosser, *J. Chem. Soc.*, 1928, 2457.

5-Methylcyclohexanone-2-acetic Acid (2-Keto-4-methylcyclohexyl-acetic acid)

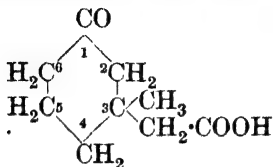
$C_9H_{14}O_3$

MW, 170

3-Methylcyclohexanone-3-acetic Acid 661

Et ester: $C_{11}H_{18}O_3$. MW, 198. Oil. B.p. 145–55° in vacuo. *Semicarbazone*: cryst. from AcOEt. M.p. 116°.

Kötz, Kayser, *Ann.*, 1906, 350, 243.

3-Methylcyclohexanone-3-acetic Acid (3-Keto-1-methylcyclohexyl-acetic acid)

$C_9H_{14}O_3$

MW, 170

M.p. 37°. B.p. 196°/15 mm.

Et ester: $C_{11}H_{18}O_3$. MW, 198. Oil. B.p. 147°/15 mm. No col. with $FeCl_3$. *Semicarbazone*: prisms from Et_2O . M.p. 158–9°.

Semicarbazone: powder from MeOH. M.p. 189°.

Farmer, Ross, *J. Chem. Soc.*, 1925, 127, 2635.

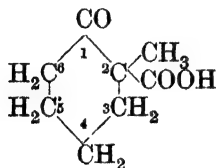
5-Methylcyclohexanone-3-acetic Acid (3-Keto-5-methylcyclohexyl-acetic acid)

Needles from pet. ether. M.p. 77°. B.p. 185°/9 mm.

Et ester: b.p. 144°/13 mm. *Semicarbazone*: prisms from AcOEt. M.p. 152°.

Semicarbazone: cryst. powder from MeOH. M.p. 218°.

Farmer, Mehta, *J. Chem. Soc.*, 1931, 2567.

2 - Methylcyclohexanone - 2 - carboxylic Acid

$C_8H_{12}O_3$

MW, 156

Et ester: $C_{10}H_{16}O_3$. MW, 184. Oil. B.p. 113°/11 mm., 108–9°/11–12 mm. Insol. alkalis. No $FeCl_3$ reaction. *Semicarbazone*: cryst. M.p. 152°. *Phenylhydrazone*: m.p. 82°.

Dieckmann, *Ber.*, 1900, 33, 2683.

Kötz, Michels, *Ann.*, 1906, 350, 212.

4 - Methylcyclohexanone - 2 - carboxylic Acid (4-Ketohexahydro-m-toluic acid).

Prisms from Et_2O . M.p. 101°. Sol. $EtOH$, Et_2O , $CHCl_3$. Spar. sol. cold H_2O . Alc. $FeCl_3$ → reddish-purple col. → bluish-red on addn. of H_2O .

6-Methylcyclohexanone-3-carboxylic Acid

Et ester: b.p. 128–30°/20 mm., 110°/10 mm. *Semicarbazone*: m.p. 134°.

Gardner, Perkin, Watson, *J. Chem. Soc.*, 1910, 97, 1769.

5 - Methylcyclohexanone - 2 - carboxylic Acid (3-Ketohexahydro-p-toluic acid).

d.

Prisms from Et_2O or pet. ether. M.p. about 102–3°. $[\alpha]_D^{17} + 97.2^\circ$ in $EtOH$. Alc. $FeCl_3$ → reddish-purple col.

Et ester: oil. B.p. 134–7°/26 mm. $[\alpha]_D^{17.5} + 84.2^\circ$ in $EtOH$.

dl.

Prisms from Et_2O . M.p. 100–103° decomp. Sol. $EtOH$, Et_2O . Mod. sol. C_6H_6 , pet. ether. Spar. sol. cold H_2O .

Et ester: oil. B.p. 132–5°/24 mm. Alc. $FeCl_3$ → intense violet col.

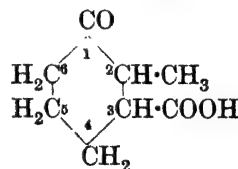
See previous reference.

6 - Methylcyclohexanone - 2 - carboxylic Acid (2-Ketohexahydro-m-toluic acid).

Syrup.

Et ester: b.p. 125–30°/20 mm., 115°/12 mm. *Semicarbazone*: m.p. 140°.

See previous reference.

2 - Methylcyclohexanone - 3 - carboxylic Acid (6-Ketohexahydro-o-toluic acid)

$C_8H_{12}O_3$

MW, 156

Cryst. M.p. about 97°.

Semicarbazone: cryst. M.p. 200–5° decomp.

Baudisch, Perkin, *J. Chem. Soc.*, 1909, 95, 1886.

5 - Methylcyclohexanone - 3 - carboxylic Acid (5-Ketohexahydro-m-toluic acid).

Syrup. B.p. 192°/15 mm.

Et ester: $C_{10}H_{16}O_3$. MW, 184. Oil. B.p. 138–40°/15 mm.

Oxime: prisms from Et_2O . M.p. 142°. Sol. warm Et_2O .

Meldrum, Perkin, *J. Chem. Soc.*, 1909, 95, 1899.

6 - Methylcyclohexanone - 3 - carboxylic Acid (2-Ketohexahydro-p-toluic acid).

2-Methylcyclohexanone-4-carboxylic Acid

Cryst. from Et₂O. M.p. 112–13°. Sol. H₂O. Spar. sol. Et₂O.

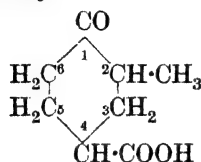
Et ester: oil. B.p. 146–8°/25 mm.

Oxime: prisms from H₂O. M.p. about 193–5°. Sol. boiling H₂O. Spar. sol. Et₂O.

Semicarbazone: cryst. from H₂O. M.p. 193–5° decomp. Spar. sol. H₂O, EtOH.

Meldrum, Perkin, *J. Chem. Soc.*, 1908, 93, 1425.

2-Methylcyclohexanone-4-carboxylic Acid (6-Ketohexahydro-m-toluic acid)



C₈H₁₂O₃ MW, 156

Cryst. M.p. 93–4°. B.p. 190–200°/20 mm. Sol. hot H₂O, EtOH, C₆H₆, CHCl₃. Spar. sol. Et₂O, pet. ether.

Oxime: needles from H₂O. M.p. 171–2°. Spar. sol. cold H₂O.

Semicarbazone: cryst. from H₂O. M.p. about 200° decomp.

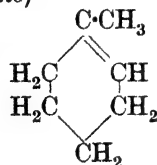
Fischer, Perkin, *J. Chem. Soc.*, 1908, 93, 1480.

3-Methylcyclohexanone-4-carboxylic Acid (5-Ketohexahydro-o-toluic acid).

Et ester: C₁₀H₁₆O₃. MW, 184. B.p. 127–9°/15 mm.

Skita, *Ber.*, 1909, 42, 1631.

1-Methylcyclohexene (Δ¹-Tetrahydrotoluene, 2-methylcyclohexene)



C₇H₁₂ MW, 96

B.p. 109–11°. D₄¹⁴ 0.8145. n_D^{18.5} 1.4503.

Nitrosite: yellow plates. M.p. 102°.

Nitrosate: cryst. from C₆H₆. M.p. 115°.

Nitroschloride: cryst. from C₆H₆. M.p. 95–7°.

Roth, Auwers, *Ann.*, 1915, 407, 154.

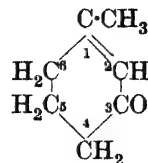
Haworth, *J. Chem. Soc.*, 1913, 103, 1246 (Note).

Murat, *Ann. chim.*, 1909, 16, 124.

Methylcyclohexene-carboxylic Acid.
See Tetrahydrotoluic Acid.

6-Methylcyclohexenone-3

1-Methylcyclohexenone-3 (3-Methyl-Δ²-cyclohexenone)



C₇H₁₀O MW, 110

M.p. about –21°. B.p. 197° (200–202°), 94.5–95.5°/22 mm. D₄²⁰ 0.9693. n_D²⁰ 1.49475. Heat of comb. C_v 942.8 Cal., C_p 944.0 Cal. Misc. with H₂O in all proportions. Volatile in steam.

Semicarbazone: cryst. from EtOH. M.p. 201° (198°).

Oxime: exists in two forms. *Labile*: m.p. 63°. B.p. 130–1°/18 mm. *Stable*: prisms from Et₂O. M.p. 88–9°. *Hydrochloride*: prisms or plates from EtOH–ligroin. M.p. 159°.

Thiosemicarbazone: m.p. 136–8°.

Rabe, Pollock, *Ber.*, 1912, 45, 2926.

Harries, *Ber.*, 1914, 47, 790.

2-Methylcyclohexenone-3 (2-Methyl-Δ²-cyclohexenone).

B.p. 178–9°. D₄²⁰ 0.966. n_D²⁰ 1.4833.

Oxime: needles. M.p. 62–3°. *Benzoyl*: m.p. 142–3°.

Semicarbazone: m.p. 211° (rapid heat.), 207–8° (slow heat.).

Wallach, *Ann.*, 1908, 359, 303.

Urien, *Compt. rend.*, 1934, 199, 363.

4-Methylcyclohexenone-3 (6-Methyl-Δ²-cyclohexenone).

B.p. 172–3°. Sol. H₂O. Volatile in steam.

Semicarbazone: cryst. from MeOH. M.p. 177–8°.

Kötz, Steinhorst, *Ann.*, 1911, 379, 17.

5-Methylcyclohexenone-3 (5-Methyl-Δ²-cyclohexenone).

B.p. 189° (170°), 86°/15 mm. D₂₆²⁶ 0.919. n_D²⁶ 1.44635.

Semicarbazone: cryst. from MeOH. M.p. 159–60°.

Kötz, Steinhorst, *Ann.*, 1911, 379, 19.

6-Methylcyclohexenone-3 (4-Methyl-Δ²-cyclohexenone).

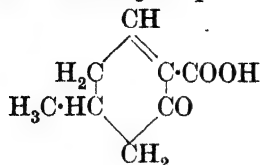
B.p. 175–6°, 81–5°/13 mm. Volatile in steam.

Semicarbazone: m.p. 184–5°.

Kötz, Blendermann, Mähner, Rosenbusch, *Ann.*, 1913, 400, 86.

5-Methyl-3-cyclohexenone-2-carboxylic Acid

5-Methyl-3-cyclohexenone-2-carboxylic Acid (5-Keto- Δ^3 -tetrahydro-p-toluic acid)

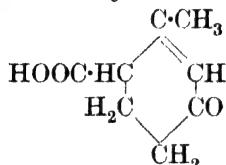


$C_8H_{10}O_3$ MW, 154

Cryst. from EtOH.Aq. M.p. 153°. Sublimes.
Et ester: $C_{10}H_{14}O_3$. MW, 182. Yellow oil.
B.p. 113°/12 mm.

Kötz, Grethe, *J. prakt. Chem.*, 1909, 80, 496.

1-Methyl-3-cyclohexenone-6-carboxylic Acid (5-Keto- Δ^6 -tetrahydro-o-toluic acid)

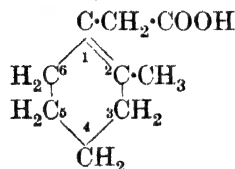


$C_8H_{10}O_3$ MW, 154

Et ester: $C_{10}H_{14}O_3$. MW, 182. B.p. 135-6°/9 mm. D_4^{20} 1.0702. n_D^{20} 1.4857.

Cornubert, Humeau, *Bull. soc. chim.*, 1931, 49, 1515.

2-Methylcyclohexenylacetic Acid (Tetrahydro-o-tolylacetic acid)



$C_9H_{14}O_2$ MW, 154

B.p. 106-8°/2 mm. $D_4^{21.1}$ 1.0373. $n_D^{21.1}$ 1.48704.
Et ester: $C_{11}H_{18}O_2$. MW, 182. B.p. 111-12°/18 mm. $D_4^{22.8}$ 0.9655. $n_D^{22.8}$ 1.46529.

Amide: $C_9H_{15}ON$. MW, 153. Plates from EtOH.Aq. or C_6H_6 -pet. ether. M.p. 138°.

Chloride: $C_9H_{13}OCl$. MW, 172.5. B.p. 104-5°/13 mm.

Nitrile: $C_9H_{13}N$. MW, 135. B.p. 101°/14 mm. D_4^{21} 0.9834. n_D^{21} 1.4762.

Anilide: needles from EtOH.Aq. or AcOEt-pet. ether. M.p. 143°.

Kon, Thakur, *J. Chem. Soc.*, 1930, 2221.

3-Methylcyclohexenylacetic Acid (Tetrahydro-m-tolylacetic acid).

d.-

Amide: needles from AcOEt-pet. ether. M.p. 150°. $[\alpha]_D + 90^\circ$ in Me_2CO .

668

N-Methylcyclohexylamine

Nitrile: b.p. 151°/90 mm. n_D 1.476. $[\alpha]_D + 69.4^\circ$ in Me_2CO .

dl.-

Cryst. from hexane. M.p. 38°. B.p. 126°/2 mm. $D_4^{15.3}$ 1.0274. $n_D^{15.4}$ 1.4824.

Me ester: $C_{10}H_{18}O_2$. MW, 168. B.p. 101.3°/13 mm. $D_4^{17.7}$ 0.9676. $n_D^{15.7}$ 1.4582.

Et ester: b.p. 112°/17 mm., 109.8°/12 mm. $D_4^{17.2}$ 0.9490, $D_4^{20.5}$ 0.9530. $n_D^{15.2}$ 1.4559.

Chloride: b.p. 82-4°/6 mm.

Amide: plates from Et₂O. M.p. 150°.

Nitrile: b.p. 152°/90 mm.

Haworth, Fyfe, *J. Chem. Soc.*, 1914, 105, 1664.

Auwers, Ellinger, *Ann.*, 1912, 387, 232.

Kon, Thakur, *J. Chem. Soc.*, 1930, 2223.

4-Methylcyclohexenylacetic Acid (Tetrahydro-p-tolylacetic acid).

d.-

$[\alpha]_D^{19} + 16.00^\circ$ in C_6H_6 .

l.-

$[\alpha]_D - 12.80^\circ$ in C_6H_6 .

dl.-

Cryst. M.p. 42-3°. B.p. 137-8°/14 mm. Sol. most org. solvents. Spar. sol. H₂O.

Me ester: b.p. 97.5-97.7°/12 mm. $D_4^{17.7}$ 0.9608.

Et ester: oil. B.p. 111°/14 mm.

Amide: cryst. from EtOH. M.p. 155-6°.

p-Toluidide: needles from C_6H_6 -pet. ether. M.p. 119°.

Nitrile: b.p. 155-6°/100 mm., 107°/15 mm.

Marckwald, Meth, *Ber.*, 1906, 39, 1175.

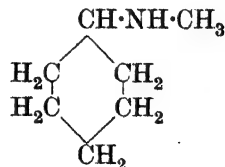
Kon, Thakur, *J. Chem. Soc.*, 1930, 2225.

Harding, Haworth, Perkin, *J. Chem. Soc.*, 1908, 93, 1967.

Methylcyclohexyl-acetic Acid.

See Hexahydrotolylacetic Acid.

N-Methylcyclohexylamine (Methylamino-cyclohexane)



$C_7H_{15}N$

MW, 113

B.p. 145-7°.

B.HCl: cryst. M.p. 193°.

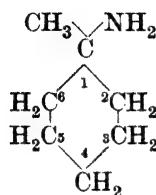
N-Acetyl: b.p. 249°/740 mm.

N-Benzoyl: needles from pet. ether. M.p. 85-6°.

N-Nitroso: yellow liq. B.p. 121°/12 mm.

Picrate: yellow cryst. from EtOH. M.p. 170°.

Skita, Rolfes, *Ber.*, 1920, **53**, 1249.
I.G., D.R.P., 523,033, (*Chem. Abstracts*, 1931, **25**, 3358).

1-MethylcyclohexylamineC₇H₁₅N

MW, 113

F.p. - 96°. B.p. 142-142.5°/750 mm. (143°/744 mm.). D₄²⁰ 0.8729, D₄²⁰ 0.8652, D₄²⁰ 0.8565. n_D²⁰ 1.4536.

B, HCl: m.p. 256-7°.

B, H₂AuCl₄: m.p. about 225° decomp.

B₂, H₂PtCl₆: decomp. at 260°.

Benzoyl: needles from EtOH.Aq. M.p. 101-101.5°.

Gutt, *Ber.*, 1907, **40**, 2069.

Nametkin, *Chem. Zentr.*, 1910, II, 1377.

2-Methylcyclohexylamine (*Hexahydro-o-toluidine*).

Cis:

B.p. 153.5-154°. D₄²⁰ 0.8778. n_D²⁰ 1.4688.

Acetyl: hexahydroacet-o-toluidide. M.p. 82°.

Benzoyl: cryst. from C₆H₆-pet. ether. M.p. 107°.

Trans:

B.p. 149.7-150.2°. D₄²⁰ 0.8688. n_D²⁰ 1.4650.

Acetyl: hexahydroacet-o-toluidide. M.p. 57°.

Benzoyl: cryst. from C₆H₆-pet. ether. M.p. 146°.

B, H₂AuCl₄: yellow needles. M.p. 205-7°.

Sol. EtOH.

B₂, H₂PtCl₆: yellow plates. M.p. about 250°.

Picrate: yellow cryst. M.p. 78-9°.

Skita, *Ber.*, 1923, **56**, 1014.

I.G., E.P., 290,175, (*Chem. Abstracts*, 1929, **23**, 846).

3-Methylcyclohexylamine (*Hexahydro-m-toluidine*).

Cis:

B.p. 152.7-153.4°. D₄²⁰ 0.8552. n_D²⁰ 1.4538.

Acetyl: hexahydroacet-m-toluidide. M.p. 74-5°.

Benzoyl: m.p. 98°.

Trans:

B.p. 151.5-152.5°. D₄²⁰ 0.8572. n_D²⁰ 1.4547.

B, HCl: m.p. 174°.

Acetyl: hexahydroacet-m-toluidide. M.p. 63°.

Benzoyl: m.p. 127°.

See previous references.

4-Methylcyclohexylamine (*Hexahydro-p-toluidine*).

Cis:

B.p. 153.3-153.7°. D₄²⁰ 0.8567. n_D²⁰ 1.4559.

Acetyl: hexahydroacet-p-toluidide. M.p. 79°.

Benzoyl: m.p. 116°.

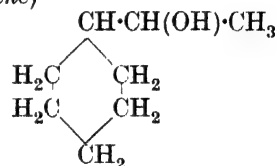
Trans:

B.p. 151.5-151.9°. D₄²⁰ 0.8543. n_D²⁰ 1.4550.

Acetyl: hexahydroacet-p-toluidide. M.p. 69.5-70°.

Benzoyl: m.p. 180°.

See previous references.

Methylcyclohexylcarbinol (*α-Hydroxy-ethylcyclohexane*)C₈H₁₆O

MW, 128

d.

B.p. 105°/35 mm., 82-3°/12 mm. D₄²⁰ 0.9254. n_D²⁰ 1.4635. [α]_D²⁰ + 5.68°.

Acetyl: b.p. 98°/30 mm. D₄¹⁷ 0.9500. [α]_D¹⁷ - 3.12°.

Acid phthalate: cryst. M.p. 75°. Mod. sol. pet. ether. 1-*Brucine salt*: cryst. from Me₂CO. M.p. 179°. [α]_D²⁰ + 55.4° in 5% EtOH.

l.

Acid phthalate: cryst. from pet. ether. M.p. 71°. [α]_D - 53° in 5% EtOH. d-*Cinchonine salt*: cryst. from CHCl₃-Me₂CO. M.p. 160-5°.

dl.

B.p. 189°/755 mm., 85-95°/10-12 mm. D₄²⁰ 0.942, D₄²⁰ 0.930. n_D²⁰ 1.468.

Acid phthalate: cryst. from 85% AcOH. M.p. 140°.

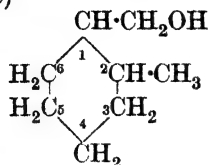
Sabatier, Mailhe, *Compt. rend.*, 1904, **139**, 344.

Dolmeo, Kenyon, *J. Chem. Soc.*, 1926, 1842.

Packendorff, *Ber.*, 1934, **67**, 906.

2-Methylcyclohexylcarbinol

2-Methylcyclohexylcarbinol (*Hexahydro-o-tolylcarbinol*)



$C_8H_{16}O$

MW, 128

Cis :

B.p. 188–9°. D_4^{20} 0.9342. n_D^{20} 1.4721.

Trans :

B.p. 192–192.5° D_4^{20} 0.9224. n_D^{20} 1.4665.

Skita, Häuber, Schönfelder, *Ann.*, 1923, 431, 1.

3-Methylcyclohexylcarbinol (*Hexahydro-m-tolylcarbinol*).

B.p. 198–9°. D_4^{20} 0.9222. n_D^{20} 1.4641.

See previous reference.

4-Methylcyclohexylcarbinol (*Hexahydro-p-tolylcarbinol*).

Trans :

B.p. 197.5–198.5°.

See previous reference and also Perkin, Pope, *J. Chem. Soc.*, 1908, 93, 1078.

Methyl cyclohexyl Ether.

See under Cyclohexanol.

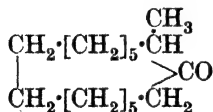
Methyl cyclohexyl Ketone.

See Acetocyclohexane.

3-Methylcyclopentadecanol.

See Muscol.

2-Methylcyclopentadecanone



$C_{16}H_{30}O$

MW, 238

B.p. 171–3°/12 mm. D_4^{16} 0.9213. n_D^{16} 1.4812.

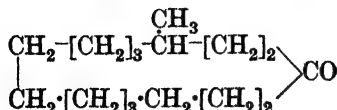
Semicarbazone : cryst. from MeOH. M.p. 149–50°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1934, 17, 1313.

3-Methylcyclopentadecanone.

See Muscone.

4-Methylcyclopentadecanone



$C_{16}H_{30}O$

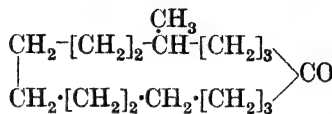
MW, 238

665 1-Methylcyclopentane-carboxylic Acid

Liq. with musk-like odour. B.p. 125°/0.5 mm. *Semicarbazone* : cryst. from EtOH. M.p. 161–2°.

Ruzicka, Schinz, Pfeiffer, *Helv. Chim. Acta*, 1928, 11, 696.

5-Methylcyclopentadecanone



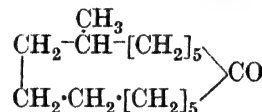
$C_{16}H_{30}O$

MW, 238

Liq. with musk-like odour. B.p. 125°/0.5 mm. *Semicarbazone* : cryst. from EtOH. M.p. 164°.

Ruzicka, Schinz, Pfeiffer, *Helv. Chim. Acta*, 1928, 11, 698.

7-Methylcyclopentadecanone



$C_{16}H_{30}O$

MW, 238

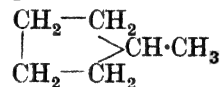
B.p. 182–3°/20 mm. D_4^{23} 0.9186. n_D^{23} 1.4781. *Semicarbazone* : leaflets from EtOH. M.p. 181–2°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1934, 17, 1318.

3-Methylcyclopentadecylene.

See Muscene.

Methylcyclopentane



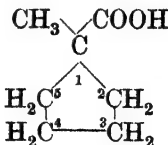
C_6H_{12}

MW, 84

B.p. 72–72.2°. D_4^{21} 0.7474. n_D^{21} 1.4088.

Zelinsky, *Ber.*, 1911, 44, 2781.

1-Methylcyclopentane-carboxylic Acid



$C_7H_{12}O_2$

MW, 128

Oil. B.p. 219–219.5°, 116–17°/16 mm. D_4^{20} 1.0392, D_4^{20} 1.0218. n_D^{20} 1.4529. Misc. with EtOH, Et₂O. Spar. sol. H₂O.

Me ester : $C_8H_{14}O_2$. MW, 142. B.p. 159.5°/721 mm. D_4^{20} 0.9850, D_4^{20} 0.9657. $n_D^{18.5}$ 1.4373.

Chloride : $C_7H_{11}OCl$. MW, 146.5. B.p. 61°/15 mm.

2-Methylcyclopentane-carboxylic Acid 666

Amide: $C_7H_{13}ON$. MW, 127. Plates from C_6H_6 . M.p. 124–5°. Spar. sol. pet. ether.

Phenyl ester: $C_{13}H_{16}O_2$. MW, 204. B.p. 149–50°/13 mm.

Tschitschibabin, *Chem. Zentr.*, 1913, I, 2028.

Meerwein, *Ann.*, 1915, 405, 171; 1918, 417, 263.

2-Methylcyclopentane-carboxylic Acid.

B.p. 113°/13 mm. D_4^{25} 1.0143. n_D^{25} 1.45042.

Chloride: b.p. 171–2°/758 mm.

Amide: plates from C_6H_6 . M.p. 147–8°.

Neenitzescu, Ionescu, *Ann.*, 1931, 491, 207.

3-Methylcyclopentane-carboxylic Acid.

l.

B.p. 115–16°/15 mm. D_4^{25} 1.006. n_D^{25} 1.4480.

$[\alpha]_D^{25}$ – 5.89°. $k = 1.07 \times 10^{-5}$ at 25°.

Chloride: b.p. 173–5°.

Amide: prisms from EtOH.Aq. M.p. 149–50°.

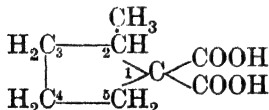
dl.

B.p. 220–1°/771 mm., 108–11°/13 mm. D_4^0 1.0296, D_4^{20} 1.0124.

Faworski, Boshowski, *Chem. Zentr.*, 1915, I, 984.

Zelinsky, *Ber.*, 1902, 35, 2690.

2-Methylcyclopentane-1 : 1-dicarboxylic Acid



$C_8H_{12}O_4$ MW, 172

Prisms from Et_2O . M.p. 173–5° → 2-methylcyclopentane-carboxylic acid. Sol. hot H_2O , EtOH, Et_2O .

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 243–4°.

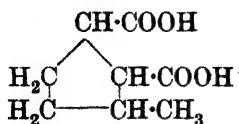
Colman, Perkin, *J. Chem. Soc.*, 1888, 53, 193.

3-Methylcyclopentane-1 : 1-dicarboxylic Acid.

Prisms. M.p. 140–2° → 3-methylcyclopentane-carboxylic acid. Very sol. hot H_2O .

Euler, *Ber.*, 1895, 28, 2957.

3-Methylcyclopentane-1 : 2-dicarboxylic Acid



$C_8H_{12}O_4$ MW, 172

3-Methylcyclopentanol-1-acetic Acid

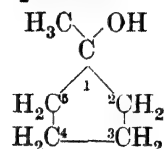
Cryst. from HCl. M.p. 104°. Very sol. H_2O . Spar. sol. HCl. Stable to $KMnO_4$.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. Yellow oil. B.p. 225°/760 mm.

Anhydride: syrup. B.p. 275°/764 mm.

Fargher, Perkin, *J. Chem. Soc.*, 1914, 105, 1365.

1-Methylcyclopentanol



$C_6H_{12}O$ MW, 100

Needles. M.p. 35–7°. B.p. 135–6°/749 mm., 51–3°/16 mm. D_4^{25} 0.9041. n_D^{25} 1.4429. Sol. most org. solvents. Sublimes.

Allophanate: m.p. 157°.

Chavanne, Devogel, *Bull. soc. chim. Belg.*, 1928, 37, 141.

Zelinsky, Moser, *Ber.*, 1902, 35, 2685.

2-Methylcyclopentanol.

Cis:

B.p. 148–9°. D_4^{16} 0.9389. n_D^{16} 1.4504.

Phenylurethane: cryst. M.p. 94°.

Allophanate: cryst. M.p. 174°.

Trans:

B.p. 150–1°. D_4^{16} 0.9258. n_D^{16} 1.4499.

Phenylurethane: cryst. M.p. 89°.

Allophanate: cryst. M.p. 174°.

Godchot, Bedos, *Compt. rend.*, 1926, 182, 393.

3-Methylcyclopentanol.

B.p. 148–9°. D_4^{16} 0.9158. n_D^{16} 1.4487. Sol.

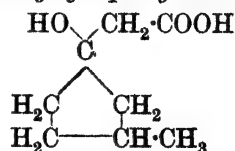
EtOH, Et_2O . Very spar. sol. H_2O .

Phenylurethane: cryst. M.p. 82°.

Godchot, Taboury, *Bull. soc. chim.*, 1913, 13, 592.

Neenitzescu, Ionescu, *Chem. Abstracts*, 1933, 27, 1329.

3-Methylcyclopentanol-1-acetic Acid (1-Hydroxy-3-methylcyclopentyl-acetic acid)



$C_8H_{14}O_3$ MW, 158

Cryst. from C_6H_6 -pet. ether. M.p. 56°.

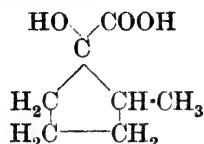
Me ester: $C_9H_{16}O_3$. MW, 172. B.p. 110–15°/12 mm.

2-Methylcyclopentanol-1-carboxylic Acid

667

Et ester: $C_{10}H_{18}O_3$. MW, 186. B.p. $121^\circ/20$ mm., $115-20^\circ/12$ mm.

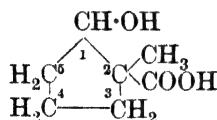
Wallach, Speranski, *Ann.*, 1901, 314, 160.
Desai, *J. Chem. Soc.*, 1932, 1074.

2 - Methylcyclopentanol - 1 - carboxylic Acid

$C_7H_{12}O_3$ MW, 144

Cryst. + $\frac{1}{2}H_2O$ from H_2O . M.p. $74-5^\circ$.

Wallach, *Ann.*, 1918, 414, 315.

2 - Methylcyclopentanol - 2 - carboxylic Acid

$C_7H_{12}O_3$ MW, 144

Cryst. B.p. $160^\circ/12$ mm. Very sol. H_2O .

Et ester: $C_9H_{16}O_3$. MW, 172. Oil. B.p. $158-60^\circ/100$ mm., $105^\circ/12$ mm. *Acetyl*: oil. B.p. $147-51^\circ/40$ mm.

Dobson, Ferns, Perkin, *J. Chem. Soc.*, 1909, 95, 2016.

3 - Methylcyclopentanol - 2 - carboxylic Acid.

Et ester: b.p. $115-17^\circ/2$ mm.

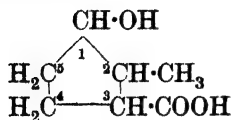
Böeseken, Slooff, Hoeffelmann, Hirsch, *Rec. trav. chim.*, 1933, 52, 892.

5 - Methylcyclopentanol - 2 - carboxylic Acid.

Oil. B.p. about $160^\circ/12$ mm.

Et ester: oil. B.p. $110-11^\circ/14$ mm.

Dieckmann, *Ann.*, 1901, 317, 75.

2 - Methylcyclopentanol - 3 - carboxylic Acid

$C_7H_{12}O_3$ MW, 144

Syrup. B.p. $182-5^\circ/20$ mm. Sol. H_2O .

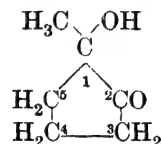
Haworth, Perkin, *J. Chem. Soc.*, 1908, 93, 584.

2-Methylcyclopentanone**4 - Methylcyclopentanol - 3 - carboxylic Acid.**

Syrup. B.p. $183-5^\circ/16$ mm. decomp.

Et ester: $C_9H_{16}O_3$. MW, 172. B.p. $127-8^\circ/13$ mm.

Hope, Perkin, *J. Chem. Soc.*, 1911, 99, 770.

1-Methyl-1-cyclopentanolone-2

$C_6H_{10}O_2$ MW, 114

B.p. $79-81^\circ/15$ mm. D^{16}_D 1.051. n^{16}_D 1.4734. Sol. H_2O , EtOH, Et $_2$ O.

Godchot, *Compt. rend.*, 1914, 158, 507.

4-Methyl-1-cyclopentanolone-2.

B.p. $86^\circ/12$ mm. Misc. with most org. solvents. No col. with alc. $FeCl_3$. Ox. \rightarrow 2-methylglutaric acid.

Me ether: $C_7H_{12}O_2$. MW, 128. B.p. $171-2^\circ/14$ mm.

Et ether: $C_8H_{14}O_2$. MW, 142. B.p. $83-5^\circ/12$ mm.

Acetyl: b.p. $109^\circ/14$ mm. *Semicarbazone*: cryst. from C_6H_6 . M.p. 174° . *p-Nitrophenylhydrazone*: m.p. 163° .

Benzoyl: m.p. $55-6^\circ$. B.p. $140^\circ/1$ mm.

Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, 7, 387.

5-Methyl-1-cyclopentanolone-2.

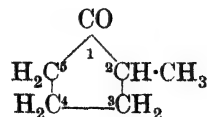
Yellowish liq. B.p. $97-8^\circ/23$ mm., $83-5^\circ/12$ mm. Sol. most org. solvents. Aq. sol. reacts acid to litmus. Ox. \rightarrow 1-methylglutaric acid. Alc. $FeCl_3 \rightarrow$ violet-red col.

Acetyl: b.p. $120-30^\circ/144$ mm.

Phenylhydrazone: m.p. $183-4^\circ$.

Godchot, Taboury, *Compt. rend.*, 1913, 156, 1779.

Rojahn, Rühl, *Arch. Pharm.*, 1926, 264, 211.

2-Methylcyclopentanone (α -Methylcyclopentanone)

$C_6H_{10}O$

MW, 98

B.p. 139° . D^{20}_D 0.9139. n^{20}_D 1.4364.

3-Methylcyclopentanone

Oxime: b.p. 103°/22 mm. *Benzoate*: m.p. 63.5°.

Semicarbazone: m.p. 184° (171°).

Bouveault, *Bull. soc. chim.*, 1899, **21**, 1022.

van Rysselberge, *Chem. Abstracts*, 1927, **21**, 375.

3-Methylcyclopentanone.

d.

B.p. 143°, 42.5–44°/13 mm. D_4^{20} 0.9140. n_D^{20} 1.4340. $[\alpha]_D^{25} + 132.96^\circ$, $[\alpha]_D^{25} + 124.2^\circ$ in EtOH. Heat of comb. C_v 840.7 Cal., C_p 841.9 Cal. Sol. H_2O .

Oxime: exists in two forms. (α) Needles. M.p. 91–92.5°. $[\alpha]_D^{25} + 51.05^\circ$ in Et_2O . *Benzoyl*: m.p. 60–1°. $[\alpha]_D^{25} + 29.77^\circ$ in Et_2O . (β) Needles. M.p. 67–9°. $[\alpha]_D^{25} + 47.99^\circ$ in Et_2O . *Benzoyl*: m.p. 60–1°. $[\alpha]_D^{25} + 34.64^\circ$ in Et_2O .

Semicarbazone: m.p. 184–5°.

i.

B.p. 144–144.5°, 57–9°/29 mm., 38°/11 mm. D_4^{22} 0.913. n_D 1.4329. Sol. H_2O .

Oxime: cryst. M.p. 60–70°.

Semicarbazone: cryst. from EtOH. M.p. 185°.

Vogel, *J. Chem. Soc.*, 1931, 907.

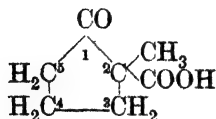
Bayer, D.R.P., 256,622, (*Chem. Zentr.*, 1913, I, 865).

Wallach, *Ann.*, 1904, **332**, 349; 1912, **394**, 371; 1918, **414**, 321.

Nenitzescu, Ionescu, *Chem. Abstracts*, 1933, **27**, 1329.

Zelinsky, *Ber.*, 1902, **35**, 2489.

2 - Methylcyclopentanone - 2 - carboxylic Acid



$C_7H_{10}O_3$

MW, 142

Me ester: $C_8H_{12}O_3$. MW, 156. B.p. 105–6°/15 mm. D_4^{20} 1.103. $NaOMe \rightarrow$ 1-methyladipic dimethyl ester. *Semicarbazone*: leaflets. M.p. 187°.

Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 120–2°/30 mm., 113°/22 mm., 103°/11 mm. D_4^{20} 1.0529. Insol. $NaOH$. No col. with alc. $FeCl_3$. Hot conc. $HCl \rightarrow$ 2-methylcyclopentanone. $NaOEt \rightarrow$ 1-methyladipic diethyl ester. *Semicarbazone*: cryst. M.p. 153°.

Nitrile: 2-methyl-2-cyanocyclopentanone. C_7H_9ON . MW, 123. B.p. 230°. Sol. 30 vols.

668 2-Methylcyclopentanone-3-carboxylic Acid

H_2O . $KOH \rightarrow$ 4-cyano-*n*-caproic acid. *Semicarbazone*: plates from EtOH. M.p. 210°.

Bouveault, Locquin, *Compt. rend.*, 1908, **146**, 138.

Best, Thorpe, *J. Chem. Soc.*, 1909, **95**, 711.

Bouveault, *Bull. soc. chim.*, 1899, **21**, 102.

4 - Methylcyclopentanone - 2 - carboxylic Acid.

Non-cryst. syrup.

Me ester: $C_8H_{12}O_3$. MW, 156. B.p. 110°/16 mm. D^{15} 1.07. $[\alpha]_D + 91.7^\circ$ in EtOH.

Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 107–8°/11 mm. D^{15} 1.05. $[\alpha]_D + 78.24^\circ$ in EtOH. Alc. $FeCl_3 \rightarrow$ violet col. Alc. $KOH \rightarrow$ 2-methyladipic acid.

Propyl ester: $C_{10}H_{16}O_3$. MW, 184. B.p. 123–4°/15 mm. D^{15} 1.029. $[\alpha]_D + 64.45^\circ$ in EtOH.

Isobutyl ester: $C_{11}H_{18}O_3$. MW, 198. B.p. 145°/25 mm. D^{15} 0.956. $[\alpha]_D + 66.9^\circ$ in EtOH.

Haller, Desfontaines, *Compt. rend.*, 1905, **140**, 1206.

Dieckmann, *Ann.*, 1901, **317**, 78.

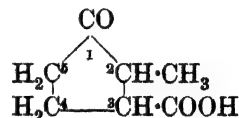
5 - Methylcyclopentanone - 2 - carboxylic Acid.

Me ester: $C_8H_{12}O_3$. MW, 156. B.p. 113–14°/19 mm. *Semicarbazone*: cryst. + $\frac{1}{2}H_2O$ from EtOH.Aq. M.p. 118°.

Et ester: $C_9H_{14}O_3$. MW, 170. Oil with characteristic odour. B.p. 117–18°/20 mm., 108–9°/13 mm. D_4^{20} 1.057. Alc. $FeCl_3 \rightarrow$ deep blue col. Hot dil. $HCl \rightarrow$ 2-methylcyclopentanone.

Bouveault, Locquin, *Compt. rend.*, 1908, **146**, 84, 138.

2 - Methylcyclopentanone - 3 - carboxylic Acid



$C_7H_{10}O_3$

MW, 142

Cryst. from Et_2O . M.p. 95°. B.p. 190–3°/20 mm. Sol. most org. solvents. Spar. sol. pet. ether.

Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 130–5°/20 mm.

Oxime: m.p. 155°. Sol. H_2O , EtOH. Spar. sol. Et_2O , $CHCl_3$, C_6H_6 .

Semicarbazone: cryst. powder from H_2O . M.p. 200–2° decomp.

Haworth, Perkin, *J. Chem. Soc.*, 1908, **93**, 582.

3-Methylcyclopentanone-3-carboxylic Acid

3 - Methylcyclopentanone - 3 - carboxylic Acid.

d.
B.p. 166–70°/12 mm. D_{16}^{25} 1.1533. n_D^{25} 1.472.
[α]_D + 13.15° in 50% EtOH.

Oxime: m.p. 145°.

Semicarbazone: cryst. from MeOH. M.p. 198–9°.

dl.

B.p. 170°/12 mm.

Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 115°/12 mm.

Semicarbazone: cryst. from H_2O . M.p. 189–90°.

Ruzicka, *Ber.*, 1917, **50**, 1368.

Semmler, Bartelt, *Ber.*, 1906, **39**, 3961.

4 - Methylcyclopentanone - 3 - carboxylic Acid.

M.p. 49–50°. B.p. 175–7°/15 mm. Sol. most org. solvents.

Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 128°/19 mm. *Semicarbazone*: cryst. from Et_2O . M.p. 124–6°.

Oxime: cryst. from Et_2O . M.p. 135–6°.

Semicarbazone: cryst. from H_2O . M.p. 215–17°.

Hope, Perkin, *J. Chem. Soc.*, 1911, **99**, 769.

5 - Methylcyclopentanone - 3 - carboxylic Acid.

B.p. 172–5°/16 mm., 162–5°/12 mm.

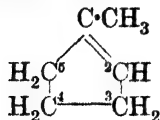
Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 126–7°/20 mm., 115–17°/14 mm. *Semicarbazone*: cryst. from Et_2O . M.p. 138–40°.

Oxime: cryst. from EtOH. M.p. 166–7° (176–7°) decomp.

Semicarbazone: m.p. 202–3° decomp.

Hope, Perkin, *J. Chem. Soc.*, 1911, **99**, 775.

1-Methylcyclopentene



C_6H_{10}

MW, 82

M.p. – 127°. B.p. 76°. D_4^{20} 0.7979. n_D^{18} 1.4347. Ox. \rightarrow 4-aceto-*n*-valeric acid.

Chavanne, Devogel, *Bull. soc. chim. Belg.*, 1928, **37**, 141.

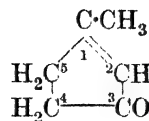
3-Methylcyclopentene.

B.p. 69–71°. D_4^{18} 0.7663. n_D^{18} 1.4222. [α]_D + 59.07°. Ox. \rightarrow 1-methylglutaric acid.

Zelinsky, *Ber.*, 1902, **35**, 2491.

1-Methylcyclopropane-1-carboxylic Acid

1-Methylcyclopentenone-3 (3-Methyl- Δ^2 -cyclopentenone)



C_6H_8O

MW, 96

B.p. 157–8°. D_4^{26} 0.9712. n_D^{26} 1.4714. Sol. H_2O , most org. solvents. $KMnO_4 \rightarrow$ formic + succinic acids.

Oxime: plates. M.p. 127°. Sol. H_2O .

Semicarbazone: plates. M.p. 230°.

Godchot, Taboury, *Compt. rend.*, 1913, **156**, 1780.

2-Methylcyclopentenone-3 (2-Methyl- Δ^2 -cyclopentenone).

Oil. B.p. 157°. D_4^{16} 0.98075. n_D^{15} 1.4762. $KMnO_4 \rightarrow$ acetic + succinic acids.

Oxime: plates from H_2O . M.p. 128°. Very sol. EtOH. Insol. pet. ether. *Acetyl*: m.p. 73°. B.p. 123°/10 mm.

Wislicenus, Looft, *Ann.*, 1893, **275**, 372.

Godchot, *Compt. rend.*, 1914, **158**, 506.

5-Methylcyclopentenone-3 (4-Methyl- Δ^2 -cyclopentenone).

B.p. 57–9°/11 mm.

Semicarbazone: m.p. 223°.

p-Nitrophenylhydrazone: m.p. 175–6°.

Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, **7**, 390.

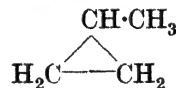
Methylcyclopentenyl-isobutyric Acid.

See α -Fencholenic Acid.

Methyl-cyclopentylamine.

See Amino-methylcyclopentane.

Methylcyclopropane



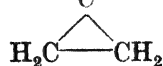
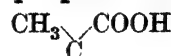
C_4H_8

MW, 56

Gas. B.p. 4–5°. D_4^{20} 0.6912. Sol. conc. H_2SO_4 with polymerisation.

Demjanow, *Ber.*, 1895, **28**, 22.

1-Methylcyclopropane-1-carboxylic Acid



$C_5H_8O_2$

MW, 100

Cryst. from hot H_2O . M.p. 28–31°. B.p. 183–5°/762 mm.

2-Methylcyclopropane-1-carboxylic Acid

Me ester: $C_6H_{10}O_2$. MW, 114. B.p. 121-3°. Kohn, Mendelewitsch, *Monatsh.*, 1921, 42, 227.

2-Methylcyclopropane-1-carboxylic Acid

$C_6H_8O_2$ MW, 100

$$\begin{array}{c} \text{CH}\cdot\text{COOH} \\ \diagup \quad \diagdown \\ \text{H}_2\text{C} \quad \text{CH}\cdot\text{CH}_3 \end{array}$$

B.p. 190-1°/745 mm., 96.5°/14 mm. D_4^{20} 1.030, D_4^{20} 1.0267. n_D^{20} 1.4411. Sol. 12 parts H_2O at 15°.

Chloride: C_5H_7OCl . MW, 118.5. B.p. 39.5°/15 mm.

Marburg, *Ann.*, 1897, 294, 131.

Wohlgemuth, *Ann. chim.*, 1915, 3, 159.

2-Methylcyclopropane-1 : 1-dicarboxylic Acid

$C_6H_8O_4$ MW, 144

$$\begin{array}{c} \text{HOOC}\cdot\text{C}\cdot\text{COOH} \\ \diagup \quad \diagdown \\ \text{H}_2\text{C} \quad \text{CH}\cdot\text{CH}_3 \end{array}$$

Needles from C_6H_6 . M.p. 113.5°. Sol. 1 part cold H_2O . Sol. $EtOH$, hot $CHCl_3$. Spar. sol. C_6H_6 . Insol. ligroin, CS_2 .

Di-Et ester: $C_{10}H_{16}O_4$. MW, 200. B.p. 221-2°/760 mm., 106-7°/8 mm. D_4^{20} 1.0546.

Marburg, *Ann.*, 1897, 294, 112.

1-Methylcyclopropane-1 : 2-dicarboxylic Acid

$C_6H_8O_4$ MW, 144

$$\begin{array}{c} \text{CH}_3 \quad \text{COOH} \\ \diagdown \quad \diagup \\ \text{C} \\ \diagup \quad \diagdown \\ \text{H}_2\text{C} \quad \text{CH}\cdot\text{COOH} \end{array}$$

Cis:

Prisms from C_6H_6 - Me_2CO . M.p. 142°. Hot $HCl \rightarrow trans$ -form.

Di-Me ester: $C_8H_{12}O_4$. MW, 172. B.p. 104°/14 mm. D_4^{20} 1.112. $n_D^{19.5}$ 1.44680.

Anhydride: $C_6H_8O_3$. MW, 126. B.p. 154-7°/19-20 mm., 126-7°/11 mm. D_4^{20} 1.234. $n_D^{21.2}$ 1.46756.

Trans:

Prisms from Me_2CO - C_6H_6 . M.p. 168°. Very stable to alk. $KMnO_4$. Acetyl chloride \rightarrow anhydride of *cis*-acid.

Di-p-toluidide: needles from $EtOH$. M.p. 255-60°.

Ingold, *J. Chem. Soc.*, 1925, 127, 396.

Auwers, Cauers, *Ann.*, 1929, 470, 304.

670

2-Methylcyclopropene-1 : 3-dicarboxylic Acid

3-Methylcyclopropane-1 : 2-dicarboxylic Acid

$C_6H_8O_4$ MW, 144

$$\begin{array}{c} \text{CH}\cdot\text{COOH} \\ \diagup \quad \diagdown \\ \text{CH}_3\cdot\text{HC} \quad \text{CH}\cdot\text{COOH} \end{array}$$

Cis:

Cryst. from $CHCl_3$. M.p. 108° (94°). Very sol. H_2O , Et_2O . Stable to alk. $KMnO_4$.

Anhydride: cryst. M.p. 80°. B.p. 270°.

Trans:

Cryst. from Et_2O or xylene. M.p. 195° (147°). B.p. 180°/20 mm. Sol. H_2O , $EtOH$, $AcOH$, Et_2O , hot toluene. Insol. C_6H_6 , $CHCl_3$, $AcOEt$, ligroin, CS_2 . Stable to alk. $KMnO_4$.

Di-Me ester: $C_8H_{12}O_4$. MW, 172. B.p. 208.5-209°, 100°/14 mm.

Di-Et ester: $C_{10}H_{16}O_4$. MW, 200. Yellow oil. B.p. 198-200°/14 mm.

Goss, Ingold, Thorpe, *J. Chem. Soc.*, 1923, 123, 3353.

Feist, *Ann.*, 1924, 436, 146.

3-Methylcyclopropane-1 : 1 : 2-tricarboxylic Acid

$C_7H_8O_6$ MW, 188

$$\begin{array}{c} \text{HOOC}\cdot\text{C}\cdot\text{COOH} \\ \diagup \quad \diagdown \\ \text{CH}_3\cdot\text{HC} \quad \text{CH}\cdot\text{COOH} \end{array}$$

Cryst. from H_2O . M.p. 215° decomp.

Mono-Et ester: $C_9H_{12}O_6$. MW, 216. Plates + $2H_2O$ from H_2O . M.p. 70-1°, anhyd. 150°.

Tri-Et ester: $C_{13}H_{20}O_6$. MW, 272. Oil. B.p. 285-7°, 163-4°/15 mm.

Preisweck, *Ber.*, 1903, 36, 1085.

1-Methylcyclopropane-1 : 2 : 3-tricarboxylic Acid

$C_7H_8O_6$ MW, 188

$$\begin{array}{c} \text{CH}_3 \quad \text{COOH} \\ \diagdown \quad \diagup \\ \text{C} \\ \diagup \quad \diagdown \\ \text{HOOC}\cdot\text{HC} \quad \text{CH}\cdot\text{COOH} \end{array}$$

Cryst. from Et_2O . M.p. 192°.

Tri-Me ester: $C_{10}H_{14}O_6$. MW, 230. Prisms from Et_2O or H_2O . M.p. 77° (76.5°). B.p. 170-80°/30 mm.

Buchner, Rehorst, *Ber.*, 1913, 46, 2686.

2-Methylcyclopropene-1 : 3-dicarboxylic Acid

$C_6H_6O_4$ MW, 142

$$\begin{array}{c} \text{C}\cdot\text{COOH} \\ \diagup \quad \diagdown \\ \text{HOOC}\cdot\text{HC} \quad \text{C}\cdot\text{CH}_3 \end{array}$$

Methylcyclopropylcarbinol

671

Cryst. + H₂O from H₂O. M.p. 200° decomp. Sublimes in needles. Decomp. on prolonged heating. Sol. hot H₂O, EtOH, Et₂O, Me₂CO, CHCl₃. Spar. sol. cold H₂O, CS₂, C₆H₆, ligroin. $k = 5.815 \times 10^{-4}$. Forms three esters, labile, normal, and enolic, the latter being readily soluble in cold dilute alkali.

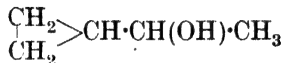
Di-Me ester: C₈H₁₀O₄. MW, 170. *Normal*: needles. M.p. 33-4°. B.p. 122°/20 mm. *Labile*: b.p. 135°/20 mm.

Di-Et ester: C₁₀H₁₄O₄. MW, 198. *Normal*: cryst. M.p. 38-9°. B.p. 135°/15 mm. *Labile*: b.p. 155°/20 mm.

Goss, Ingold, Thorpe, *J. Chem. Soc.*, 1923, 123, 348.

Feist, *Ber.*, 1893, 26, 759.

Methylcyclopropylcarbinol (α -Hydroxyethyl-cyclopropane)



C₅H₁₀O MW, 86

B.p. 123-4°/759 mm., 119-20°. D₄²⁰ 0.8805 (0.88778). n_D²⁰ 1.4246 (1.42740).

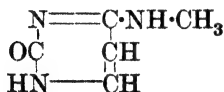
Michiels, *Chem. Zentr.*, 1912, I, 1105.

Henry, *Bull. soc. chim. Belg.*, 1931, 40, 647.

Methyl cyclopropyl Ketone.

See Acetocyclopropane.

N-Methylcytosine (4-Methylaminopyrimidine-2)



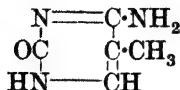
C₅H₇ON₃ MW, 125

Cubes from Me₂CO.Aq. M.p. 270°. Sol. H₂O, EtOH. Insol. Me₂CO, Et₂O.

Picrate: prisms from H₂O. M.p. 220-5°.

Case, Hill, *J. Am. Chem. Soc.*, 1929, 51, 1590.

5-Methylcytosine



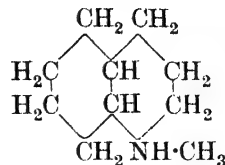
C₅H₇ON₃ MW, 125

Prisms from H₂O. M.p. 270° decomp. 100 parts H₂O dissolve 4.5 parts at 25°.

Wheeler, Johnson, *Am. Chem. J.*, 1904, 31, 591.

3-Methyldecane-1 : 10-dicarboxylic Acid

N-Methyldecahydroquinoline



C₁₀H₁₇N

MW, 151

Cis:

B.p. 208.5-209.5°.

B,HAuCl₄: m.p. 103°.

Picrate: cryst. from EtOH. M.p. 199-200°.

Trans:

B.p. 204-5°.

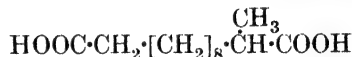
B,HAuCl₄: m.p. 107.5°.

Picrate: cryst. from H₂O. M.p. 173°.

Picrolonate: cryst. from EtOH. M.p. 205-5°.

Ehrenstein, Bunge, *Ber.*, 1934, 67, 1728.

1-Methyldecane-1 : 10-dicarboxylic Acid



C₁₃H₂₄O₄

MW, 244

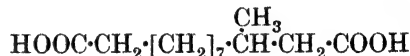
Needles from C₆H₆-pet. ether. M.p. 76-76.5°. B.p. 210-15°.

Di-Me ester: C₁₅H₂₈O₄. MW, 272. B.p. 187-8°/13 mm. D₁₅¹⁵ 0.966.

Di-Et ester: C₁₇H₃₂O₄. MW, 300. B.p. 197°/12 mm. D₁₅¹⁵ 0.940.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, 10, 168.

2-Methyldecane-1 : 10-dicarboxylic Acid



C₁₃H₂₄O₄

MW, 244

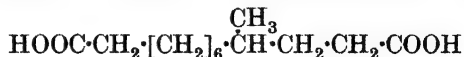
Cryst. from C₆H₆. M.p. 82°. B.p. 237-8°/7 mm., 210-11°/1 mm. Sol. EtOH, Et₂O, Me₂CO, C₆H₆. Spar. sol. H₂O.

Di-Me ester: b.p. 175-6°/8 mm. D₁₅¹⁵ 0.975.

Di-Et ester: b.p. 187-9°/8 mm. D₁₅¹⁵ 0.947.

See previous reference.

3-Methyldecane-1 : 10-dicarboxylic Acid



C₁₃H₂₄O₄

MW, 244

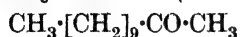
Cryst. from C₆H₆-pet. ether. M.p. 71°.

Di-Et ester: b.p. about 140°/0.5 mm.

Ruzicka, Steiger, *Helv. Chim. Acta*, 1927, 10, 689.

Methyl *n*-decyl Ketone

Methyl *n*-decyl Ketone (*Dodecanone-2*)



$\text{C}_{12}\text{H}_{24}\text{O}$ MW, 184

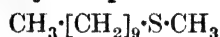
M.p. 21°. B.p. 246–7°, 177–8°/100 mm., 144°/11 mm. Ox. \rightarrow acetic and capric acids.

Semicarbazone: needles from EtOH.Aq. M.p. 122–3°.

Krafft, *Ber.*, 1882, 15, 1708.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, 99, 57.

Methyl *n*-decyl sulphide

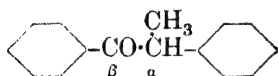


$\text{C}_{11}\text{H}_{24}\text{S}$ MW, 188

B.p. 125°/13 mm.

v. Braun, Teuffert, Weissbach, *Ann.*, 1929, 472, 139.

α -Methyldeoxybenzoin (*ms-Methyldeoxybenzoin*, β -phenylpropiophenone)



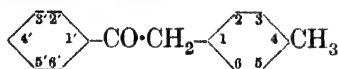
$\text{C}_{15}\text{H}_{14}\text{O}$ MW, 210

Needles from EtOH. M.p. 53°. B.p. 317.5–318.5°.

Oxime: needles. M.p. 120°.

Meyer, Oelkers, *Ber.*, 1888, 21, 1297.

4-Methyldeoxybenzoin (ω -*p*-Tolylacetophenone, *phenyl p-xylol ketone*)



$\text{C}_{15}\text{H}_{14}\text{O}$ MW, 210

Cryst. from EtOH. M.p. 94°.

Oxime: m.p. 109°.

Strassmann, *Ber.*, 1889, 22, 1231.

2'-Methyldeoxybenzoin (*o*-Tolyl benzyl ketone).

B.p. 318–20°.

Mailhe, *Bull. soc. chim.*, 1914, 15, 325.

3'-Methyldeoxybenzoin (*m*-Tolyl benzyl ketone).

Leaflets. M.p. 42°.

Semicarbazone: m.p. 168°.

See previous reference.

4'-Methyldeoxybenzoin (*p*-Tolyl benzyl ketone).

Leaflets. M.p. 110°. B.p. above 360°. Very sol. CHCl_3 , C_6H_6 . Sol. EtOH, Et_2O . Dil. $\text{HNO}_3 \rightarrow$ *p*-toluic and terephthalic acids. Na in EtOH \rightarrow *p*-tolylbenzylcarbinol.

672 6-Methyl-1': 2': 5': 6'-dibenzanthracene

Oxime: leaflets from EtOH. M.p. 131°.

Azine: yellow needles from CHCl_3 -EtOH. M.p. 172–3°. Spar. sol. EtOH.

Strassmann, *Ber.*, 1889, 22, 1229.

Mailhe, *Bull. soc. chim.*, 1914, 15, 325.

Methyldiacetamide.

See under Methylamine.

2-Methyldiallyl.

See 2-Methyl-1: 5-hexadiene.

Methyldiallylcarbinol (4-Methyl-1: 6-heptadienol-4)



$\text{C}_8\text{H}_{14}\text{O}$ MW, 126

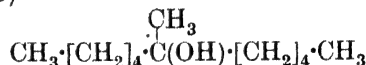
B.p. 158.4° (157–9°). D_4^{20} 0.87747 (0.8638), D_{20}^{20} 0.86134, D_{20}^{20} 0.86258. Heat of comb. C_p 1192.7 Cal. $\text{CrO}_3 \rightarrow$ acetic acid. $\text{KMnO}_4 \rightarrow$ 2-hydroxy-2-methylglutaric acid.

Acetyl: b.p. 177.3°.

Saizew, *J. prakt. Chem.*, 1907, 76, 100.

Sorokin, *Ann.*, 1877, 185, 169.

Methyldi-*n*-amylcarbinol (6-Methylundecanol-6)

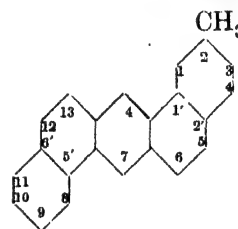


$\text{C}_{12}\text{H}_{26}\text{O}$ MW, 186

B.p. 80–3°/2 mm. D_4^{25} 0.8271. n_D^{20} 1.4392.

Whitmore, Williams, *J. Am. Chem. Soc.*, 1933, 55, 408.

2-Methyl-1': 2': 5': 6'-dibenzanthracene



$\text{C}_{23}\text{H}_{16}$ MW, 292

Nodules from xylene. M.p. 256–7°. Carcinogenic.

Cook, *J. Chem. Soc.*, 1931, 494.

3-Methyl-1': 2': 5': 6'-dibenzanthracene.

Leaflets from C_6H_6 . M.p. 244–5°. Sol. C_6H_6 . Spar. sol. AcOH. Sols. show green fluor. Carcinogenic.

See above reference and also

Fieser, Dietz, *Ber.*, 1929, 62, 1831.

6-Methyl-1': 2': 5': 6'-dibenzanthracene.

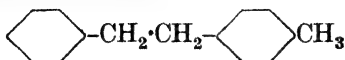
Needles from C_6H_6 . M.p. 184–5°. B.p. 260–300°/2–3 mm. Carcinogenic.

Di-picrate: red needles from C_6H_6 . M.p. 200–1°.

Cook, *J. Chem. Soc.*, 1933, 1596.

 α -Methyldibenzyl.

See 1 : 2-Diphenylpropane.

4-Methyldibenzyl (1-Phenyl-2-p-tolyethane)

$C_{15}H_{16}$ MW, 196

M.p. 27°. B.p. 286°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆.

Mailhe, de Godon, *Bull. soc. chim.*, 1917, 21, 63.

Mann, *Ber.*, 1881, 14, 1646.

N-Methyldibenzylamine

$C_{15}H_{17}N$ MW, 211

B.p. 304–5°/765.5 mm., 143°/1 mm.

B, HCl: m.p. 200–1°.

B, HBr: cryst. from AcOEt. M.p. 157°. Sol. EtOH, CHCl₃, Me₂CO. Insol. Et₂O, C₆H₆.

B, HAuCl₄: yellow needles. Sinters at 125°, m.p. about 135°.

B₂, HAuCl₄, HCl: yellow needles or plates from dil. EtOH. Sinters at 120°, m.p. 134–6°.

B₂, H₂PtCl₆: m.p. 192° decomp. Sol. EtOH. Spar. sol. H₂O.

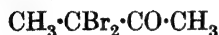
Picrate: cryst. from dil. EtOH. M.p. 107°.

Emde, *Arch. Pharm.*, 1909, 247, 367.

v. Meyer, *Chem. Zentr.*, 1909, 11, 1800.

Emde, Schellbach, *Arch. Pharm.*, 1911, 249, 115.

Goss, Ingold, Wilson, *J. Chem. Soc.*, 1926, 2457.

Methyl 1 : 1-dibromoethyl Ketone (3 : 3-Dibromobutanone-2)

$C_4H_6OBr_2$ MW, 230

B.p. 194–5°, 80–3°/10 mm. D_{20}^{20} 1.1729. Boiling dil. H₂SO₄ \rightarrow diacetyl.

Faworski, Issatschenko, *J. prakt. Chem.*, 1913, 88, 657.

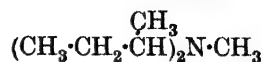
Methyl 1 : 2-dibromoethyl Ketone (3 : 4-Dibromobutanone-2)

$C_4H_6OBr_2$ MW, 230

B.p. 53°/0.2 mm. Slowly darkens on standing.

Schlotterbeck, *Ber.*, 1909, 42, 2563.

Dict. of Org. Comp.—II.

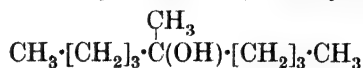
Methyldi-sec.-butylamine

$C_9H_{21}N$ MW, 143

B.p. 155–7°.

Picrate: cryst. from EtOH. M.p. 92–3°.

Skita, Keil, Havemann, *Ber.*, 1933, 66, 1409.

Methyldibutylcarbinol (5-Methylnonanol-5)

$C_{10}H_{22}O$ MW, 158

B.p. 91.4–92.4°/15 mm., 84–5°/10 mm. D_4^{20} 0.8290. n_D^{20} 1.4341.

Whitmore, Woodburn, *J. Am. Chem. Soc.*, 1933, 55, 363.

Stadnikow, *Ber.*, 1914, 47, 2138.

N - Methyl - 2 : 6 - di - [carboxymethyl] - piperidine.

See Lobelinic Acid.

Methyldichloroamine.

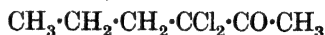
See N-Dichloromethylamine.

Methyldichloroarsine (Dichloro-methylarsine, methylarsine dichloride)

CH_3Cl_2As MW, 161

B.p. 133°. Mod. sol. H₂O. Sol. EtOH, Et₂O. D_4^{20} 1.838.

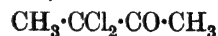
Uhlinger, Cook, *Chem. Zentr.*, 1919, III, 597.

Methyl 1 : 1-dichlorobutyl Ketone (3 : 3-Dichlorohexanone-2)

$C_6H_{10}OCl_2$ MW, 169

Oil. B.p. 162–4°, 55°/15 mm. D^{20} 1.1469, D^{21} 1.1263. $Zn + HCl \rightarrow$ methyl butyl ketone.

Faworski, *J. prakt. Chem.*, 1895, 51, 544.

Methyl 1 : 1-dichloroethyl Ketone (3 : 3-Dichlorobutanone-2)

$C_4H_6OCl_2$ MW, 141

B.p. 111–12°, 30°/30 mm. D^{17} 1.2025.

Faworski, Desbout, *J. prakt. Chem.*, 1895, 51, 549.

Methyl 1 : 2-dichloroisobutyl Ketone (2 : 3-Dichloro-2-methylpentanone-4, mesityl oxide dichloride)

$C_6H_{10}OCl_2$ MW, 169
43

B.p. 77°/12 mm. D_4^{21} 1.1942.

Pauly, Lieck, *Ber.*, 1900, **33**, 502.

Methyl 1 : 1-dichloropropyl Ketone (3 : 3-Dichloropentanone-2)



$\text{C}_5\text{H}_8\text{OCl}_2$ MW, 155

B.p. 138°, 55–8°/20 mm. D^{22} 1.1711. $\text{Zn} + \text{HCl} \rightarrow$ methyl propyl ketone.

Faworski, *J. prakt. Chem.*, 1895, **51**, 535.

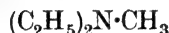
Methyl diethoxypropionate.

See under Formylacetic Acid.

1-Methyl-1 : 1-diethylacetone.

See 3-Methyl-3-ethylpentanone-2.

Methyldiethylamine



$\text{C}_5\text{H}_{13}\text{N}$ MW, 87

B.p. 66–7° (63–5°). Sol. H_2O . $k = 2.7 \times 10^{-4}$ at 25°.

B, HCl : m.p. 178.5°. Deliquescent. Sol. EtOH , CHCl_3 . Insol. Et_2O .

B, HBr : needles from EtOH . M.p. 169°. Deliquescent. Sol. EtOH , CHCl_3 . Insol. Et_2O .

B, HI : m.p. 115–18°. Deliquescent. Sol. EtOH , CHCl_3 . Insol. Et_2O .

$B, \text{H}_2\text{PtCl}_6$: orange-yellow cryst. M.p. 231°.

Picrate: prisms from H_2O . M.p. 185°.

v. Meyer, Lecco, *Ann.*, 1876, **180**, 184.

Lossen, *Ann.*, 1876, **181**, 379.

Collie, Schryver, *J. Chem. Soc.*, 1890, **57**, 779.

Passon, *Ber.*, 1891, **24**, 1681.

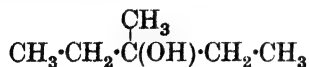
Emmert, *Ber.*, 1909, **42**, 1509.

Bayer, D.R.P., 287,802, (*Chem. Zentr.*, 1915, II, 1033).

2-Methyl-1 : 4-diethylbutadiene-1 : 3.

See 4-Methyloctadiene-3 : 5.

Methyldiethylcarbinol (3-Methylpentanol-3, 3-hydroxy-3-methylpentane)



$\text{C}_6\text{H}_{14}\text{O}$ MW, 102

B.p. 122.1–122.9°/760 mm. (121–122.5°/758 mm., 122–3°/756.5 mm.). D_0^{20} 0.8452, D_0^{20} 0.8237, D_0^{20} 0.8194. n_D^{21} 1.418. Heat of comb. C_6 935.5 Cal., C_p 937.3 Cal.

Acetyl: b.p. 148°. D_{20}^{20} 0.8834.

Pariselle, Simon, *Compt. rend.*, 1921, **173**, 86.

Bayer, D.R.P., 166,899, (*Chem. Zentr.*, 1906, I, 720).

Henry, *Rec. trav. chim.*, 1907, **26**, 94.

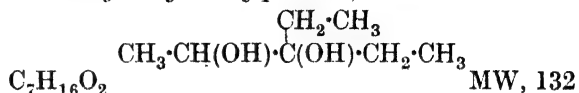
Wislicenus, *Ann.*, 1883, **219**, 319.

Reformatski, *J. prakt. Chem.*, 1887, **36**, 340.

1-Methyl-2 : 2-diethylethylene.

See 3-Ethylpentene-2.

1-Methyl-2 : 2-diethylethylene Glycol (3-Ethylpentandiol-2 : 3, 3-ethyl-2-pentene glycol, 2 : 3-dihydroxy-3-ethylpentane)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

B.p. 194–7°, 105°/17 mm. D^{20} 0.957. 25% $\text{H}_2\text{SO}_4 \rightarrow$ unsym.-diethylacetone.

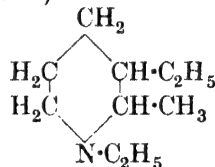
Tiffeneau, Dorlencourt, *Compt. rend.*, 1906, **143**, 127.

Gauthier, *Compt. rend.*, 1911, **152**, 1101.

Methyldiethylmethane.

See 3-Methylpentane.

2-Methyl-N-3-diethylpiperidine (1 : 3-Diethyl- α -pipecoline)



$\text{C}_{10}\text{H}_{21}\text{N}$ MW, 155

B.p. 187–92°/743 mm. D_4^0 (in vacuo) 0.8819, D_4^{27} (in vacuo) 0.8517. Insol. H_2O .

B, HAuCl_4 : needles. M.p. 73–4°.

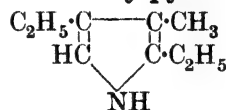
$B, \text{HCl}, 5\text{HgCl}_2$: greyish-red cryst. from EtOH . M.p. 84°. Decomp. at 130°.

Picrate: yellow prisms from EtOH . M.p. 117°.

Ladenburg, *Ann.*, 1899, **304**, 70.

See also Lipp, Widmann, *Ann.*, 1915, **409**, 110.

3-Methyl-2 : 4-diethylpyrrole



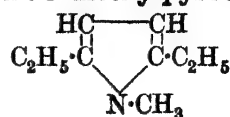
$\text{C}_9\text{H}_{15}\text{N}$ MW, 137

Oil. B.p. 205°/730 mm., 95–6°/11 mm.

Picrate: cryst. from EtOH . M.p. 110°.

Fischer, Seidel, D'Ennequin, *Ann.*, 1933, **500**, 180.

N-Methyl-2 : 5-diethylpyrrole



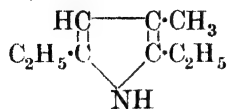
$\text{C}_9\text{H}_{15}\text{N}$

MW, 137

Oil. B.p. 201-2°/739 mm., 89.0-89.2°/13 mm.

Lukeš, *Chem. Abstracts*, 1932, **26**, 4328.

3-Methyl-2 : 5-diethylpyrrole



$C_9H_{15}N$

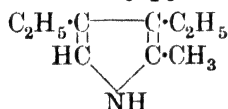
MW, 137

Oil. B.p. 94-5°/15 mm.

Picrate: yellow cryst. from EtOH. M.p. 90-1°.

Fischer, Eismayer, *Ber.*, 1914, **47**, 1827.

2-Methyl-3 : 4-diethylpyrrole



$C_9H_{15}N$

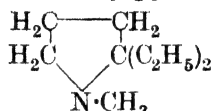
MW, 137

Colourless oil. B.p. 202-3°. D_{17}^{20} 0.90996. n_D^{17} 1.49879. Volatile in steam.

Picrate: cryst. from EtOH. M.p. 101°.

Fischer, Baumler, *Ann.*, 1929, **468**, 78.

1-Methyl-2 : 2-diethylpyrrolidine



$C_9H_{19}N$

MW, 141

Oil. B.p. 168°.

B.HCl: hygroscopic cryst. from $CHCl_3$.

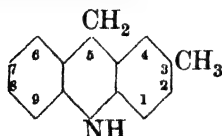
Aurichloride: cryst. M.p. 159-63°. Sol. EtOH, $CHCl_3$.

Picrate: cryst. M.p. 233°. Sol. H_2O , EtOH.

Lukeš, *Chem. Abstracts*, 1933, **27**, 5324.

Methyldiglycolamidic Acid.

See Methyliminodiacetic Acid.

3-Methyl-*ms*-dihydroacridine

$C_{14}H_{13}N$

MW, 195

Plates from EtOH. M.p. 157°. Sublimes undecomp. $CrO_3 \rightarrow$ 3-methylacridine.

Kahn, *Ann.*, 1894, **279**, 274.

5-Methyl-*ms*-dihydroacridine.

Cryst. from EtOH. M.p. 124-125.5°.

N-Acetyl: cryst. from $AcOEt$. M.p. 162°.

$C_{14}H_{13}N$, $C_6H_3(NO_2)_3$ -1 : 3 : 5: black needles from EtOH. M.p. 117-18°.

Sastry, *J. Chem. Soc.*, 1916, **109**, 272.

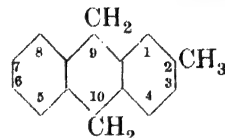
Blum, *Ber.*, 1929, **62**, 892.

N-Methyl-*ms*-dihydroacridine (10-Methyl-5 : 10-dihydroacridine).

Cryst. from EtOH.Aq. M.p. 96°.

Pictet, Patry, *Ber.*, 1902, **35**, 2536.

2-Methyl-9 : 10-dihydroanthracene



$C_{15}H_{14}$

MW, 194

White needles from 70% EtOH. M.p. 51°. Darkens in air. Volatile in steam.

Fischer, *J. prakt. Chem.*, 1915, **92**, 51.

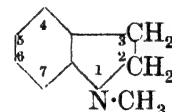
9-Methyl-9 : 10-dihydroanthracene (*ms*-Methyl-9 : 10-dihydroanthracene).

Needles. M.p. 30°. B.p. 314-15°/740 mm. Sol. most org. solvents.

Fischer, Ziegler, *J. prakt. Chem.*, 1912, **86**, 289.

2-Methyl-4 : 5-dihydroglyoxaline.

See Lysidine.

N-Methyldihydroindole (1-Methylindoline)

$C_9H_{11}N$

MW, 133

B.p. 216°/728 mm. Sol. EtOH, Et_2O . Spar. sol. H_2O . Volatile in steam.

Picrate: yellow plates from C_6H_6 . M.p. 165° (155°).

Wenzing, *Ann.*, 1887, **239**, 246.

Carrasco, *Gazz. chim. ital.*, 1908, **38**, 306.

2-Methyldihydroindole (2-Methylindoline).

d.

N-Acetyl: needles from pet. ether. M.p. 89°. $[\alpha]_D + 59.6^\circ$ in EtOH.

N-Benzoyl: cryst. from dil. EtOH. M.p. 119°. $[\alpha]_D + 37^\circ$ in EtOH.

l.

Liq. with blue fluor. B.p. 228-9°. $[\alpha]_D + 7.2^\circ$ in EtOH, -13.5° in Et_2O , $+8.3^\circ$ in C_6H_6 . *B.HCl*: needles from C_6H_6 . M.p. 58°. $[\alpha]_D + 1.7^\circ$ in H_2O .

N-Acetyl: needles from pet. ether. M.p. 89°. $[\alpha]_D - 61.9^\circ$ in EtOH.

3-Methyldihydroindole

N-Benzoyl: needles from EtOH. M.p. 119°. $[\alpha]_D -37.1^\circ$ in EtOH.

dl.

B.p. 228-9°, 116-116.5°/20 mm. D_4^{20} 1.0231, $D_4^{25.4}$ 1.0197. $n_D^{25.4}$ 1.5687. $Ag_2SO_4 \rightarrow$ 2-methylindole. $HI + P$ at 240° \rightarrow 2-propylaniline.

N-Acetyl: needles from ligroin. M.p. 55-6°.

N-Benzoyl: prisms from EtOH. M.p. 91.5°.

N-Benzenesulphonyl: cryst. from EtOH. M.p. 90°.

Nitroso deriv.: yellow prisms from ligroin. M.p. 54-5°.

Picrate: yellow prisms from C_6H_6 . M.p. 151°.

Jackson, *Ber.*, 1881, **14**, 883.

Pope, Clarke, *J. Chem. Soc.*, 1904, **85**, 1331.

Wenzing, *Ann.*, 1887, **239**, 244.

Carrasco, *Gazz. chim. ital.*, 1908, **38**, 305.

v. Braun, Steindorff, *Ber.*, 1904, **37**, 4729.

3-Methyldihydroindole (3-Methylindoline, 2:3-dihydroskatole).

B.p. 231-2°/744 mm. Sol. EtOH, Et_2O , ligroin. Spar. sol. H_2O .

Picrate: cryst. from C_6H_6 . M.p. 149-50°.

Fischer, *Ber.*, 1886, **19**, 1566.

Wenzing, *Ann.*, 1887, **239**, 242.

4-Methyldihydroindole (4-Methylindoline).

B.p. 245°, 124-6°/12 mm. D_4^{20} 1.038.

B, HCl : m.p. 235°.

N-Benzoyl: m.p. 117-18°.

N-Benzenesulphonyl: m.p. 135°.

Picrate: yellow cryst. M.p. 188°.

Kruber, *Ber.*, 1929, **62**, 2879.

7-Methyldihydroindole (7-Methylindoline).

B.p. 240-3°, 120-2°/10 mm. D_4^{20} 1.044.

B, HCl : m.p. 199-200°.

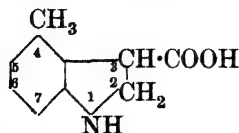
N-Benzoyl: m.p. 106°.

N-Benzenesulphonyl: m.p. 131°.

Picrate: yellow cryst. M.p. 186°.

Kruber, *Ber.*, 1926, **59**, 2756.

4-Methyldihydroindole-3-carboxylic Acid (4-Methylindoline-3-carboxylic acid)



$C_{10}H_{11}O_2N$ MW, 177

Yellow cryst. from hot H_2O . M.p. 223°. Sol. EtOH, Me_2CO .

Kruber, *Ber.*, 1929, **62**, 2878.

676

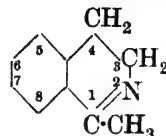
Methyl-dihydroxyisopropyl-cyclohexane

7-Methyldihydroindole-3-carboxylic Acid (7-Methylindoline-3-carboxylic acid).

Needles from EtOH. M.p. 237° decomp. Sol. hot H_2O . Spar. sol. org. solvents.

Kruber, *Ber.*, 1926, **59**, 2755.

1-Methyl-3:4-dihydroisoquinoline



$C_{10}H_{11}N$

MW, 145

B.p. 237-42°, 130°/10 mm. Sol. EtOH. Insol. H_2O .

Picrate: m.p. 188-90°.

Späth, Berger, Kuntara, *Ber.*, 1930, **63**, 136.

4-Methyl-3:4-dihydroisoquinoline.

Picrate: cryst. M.p. 132-3°.

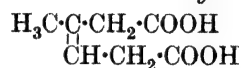
See previous reference.

5-Methyl-3:4-dihydroisoquinoline.

Picrate: cryst. M.p. 182-3° decomp.

See previous reference.

2-Methyl-Δ²-dihydromuconic Acid (2-Methyl-2-butylene-1:4-dicarboxylic acid)



$C_7H_{10}O_4$

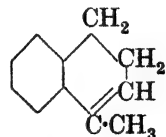
MW, 158

Cryst. from H_2O or Et_2O-Me_2CO . M.p. 140-1°. $KMnO_4 \rightarrow$ acetic acid.

Di-Me ester: $C_9H_{14}O_4$. MW, 186. Oil with odour of melons. B.p. 245°/753 mm. D_4^{20} 1.0824.

Pauly, Will, *Ann.*, 1918, **416**, 14.

4-Methyl-1:2-dihydronaphthalene



$C_{11}H_{12}$

MW, 144

B.p. 107°/14 mm. D_4^{20} 0.9901.

Picrate: yellow cryst. from EtOH. M.p. 142°.

Auwers, *Ber.*, 1925, **58**, 151.

Schroeter, *ibid.*, 720.

Methyl-dihydroxyisopropyl-cyclohexane.

See p-Menthandiol-8:9.

Methyl-2 : 5-dihydroxyphenylethyl-amine**Methyl - 2 : 5 - dihydroxyphenylethyl - amine.**

See β -Methylaminoethylhydroquinone.

Methyl-2 : 3-dihydroxypropyl-amine.

See 3-Methylaminopropylene Glycol.

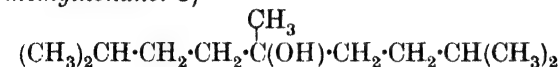
Methyldi-iodoarsine (Di-iodo-methylarsine, methylarsine di-iodide)

$\text{CH}_3\text{I}_2\text{As}$

MW, 344

Yellow needles from EtOH. M.p. 25° . Decomp. at 200° approx. Sol. EtOH, Et_2O , CS_2 . Spar. sol. H_2O .

Auger, *Compt. rend.*, 1906, **142**, 1151.

Methyldi-isoamylcarbinol (2 : 5 : 8-Tri-methylnonan-5-ol)

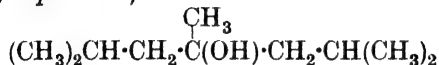
$\text{C}_{12}\text{H}_{26}\text{O}$

MW, 186

B.p. $108-9^\circ/10$ mm. D_4^{20} 0.847, D_4^{25} 0.8373. n_D^{25} 1.44253.

Acetyl: b.p. $120^\circ/16$ mm. $D_4^{16.9}$ 0.864. $n_D^{16.9}$ 1.43191.

Grignard, *Compt. rend.*, 1901, **132**, 338, (*Chem. Zentr.*, 1901, II, 624).

Methyldi-isobutylcarbinol (2 : 4 : 6-Tri-methylheptan-4-ol)

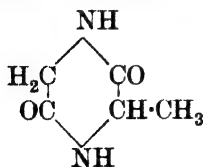
$\text{C}_{10}\text{H}_{22}\text{O}$

MW, 158

B.p. $180-2^\circ/753$ mm., $78-80^\circ/12$ mm. D^{21} 0.823. n_D^{18} 1.4334.

Bodroux, Taboury, *Bull. soc. chim.*, 1909, **5**, 813.

Halse, *J. prakt. Chem.*, 1914, **89**, 458.

3-Methyl-2 : 5-diketopiperazine (Glycyl-alanine anhydride, methyldiacipiperazine)

$\text{C}_5\text{H}_8\text{O}_2\text{N}_2$

MW, 128

*d*l-.

Cryst. M.p. 247° decomp. Sublimes. $[\alpha]_D^{20} - 5.0^\circ$ in H_2O .

*dl*l-.

Found in dog hair. Needles from EtOH.Aq.

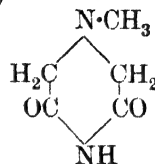
677

N-Methyl-2 : 6-diphenacylpiperidine

M.p. 244° ($238-9^\circ$). Sol. H_2O , hot EtOH. Spar. sol. Me_2CO . Reacts neutral. Reduces Fehling's and $\text{NH}_3 \cdot \text{AgNO}_3$. Tasteless.

Heimrod, *Ber.*, 1914, **47**, 344.

Abderhalden, *Komm. Z. physiol. Chem.*, 1925, **145**, 308.

4-Methyl-2 : 6-diketopiperazine (Methyl-iminodiacetamide)

$\text{C}_5\text{H}_8\text{O}_2\text{N}_2$

MW, 128

Yellow cryst. from AcOH. M.p. $105-6^\circ$.

B, HCl: needles from MeOH-HCl. Darkens at $240-5^\circ$.

B, HNO_3: needles from MeOH- HNO_3 . Darkens at 130° .

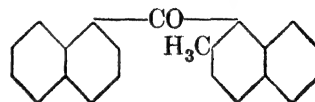
Franchimont, Dubsky, *Rec. trav. chim.*, 1916, **36**, 96.

2-Methyl-1 : 3-di-[p-methoxyphenyl]-pentene-1.

See Isoanethole.

Methyl dimethylaminoethyl Ether.

See under 2-Methoxyethylamine.

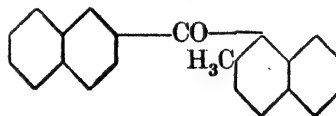
2-Methyl-1 : 1'-dinaphthyl Ketone

$\text{C}_{22}\text{H}_{16}\text{O}$

MW, 296

Cryst. from EtOH. M.p. 171° . Sol. conc. $\text{H}_2\text{SO}_4 \rightarrow$ orange yellow sol. Heat at b.p. \rightarrow 1 : 2 : 7 : 8-dibenzanthracene.

Fieser, Dietz, *Ber.*, 1929, **62**, 1829.

2-Methyl-1 : 2'-dinaphthyl Ketone

$\text{C}_{22}\text{H}_{16}\text{O}$

MW, 296

Needles from EtOH. M.p. $142-3^\circ$. Sol. conc. $\text{H}_2\text{SO}_4 \rightarrow$ orange sol. Heat at b.p. \rightarrow 1 : 2 : 5 : 6-dibenzanthracene.

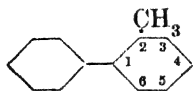
See previous reference.

N-Methyl-2 : 6-diphenacylpiperidine.

See Lobelanine.

2-Methyldiphenyl

2-Methyldiphenyl (*Phenyl-o-tolyl*, *o-phenyl-toluene*)



$C_{13}H_{12}$

MW, 168

B.p. $261-4^{\circ}$ ($255-8^{\circ}$), $130-6^{\circ}/27$ mm. D_4^{20} 1.010. CrO_3 or $KMnO_4 \rightarrow$ diphenyl-2-carboxylic acid.

Sherwood, Short, Stansfield, *J. Chem. Soc.*, 1932, 1834.

Oddo, Curatolo, *Gazz. chim. ital.*, 1895, 25, 132.

Jacobson, *Ber.*, 1895, 28, 2551.

Gomberg, Pernert, *J. Am. Chem. Soc.*, 1926, 48, 1376.

3-Methyldiphenyl (*Phenyl-m-tolyl*, *m-phenyl-toluene*).

B.p. $272-7^{\circ}$ ($267-9^{\circ}$), $148-50^{\circ}/20$ mm. D^0 1.031, D^{25} 1.010. n_D^{25} 1.5916. CrO_3 or $KMnO_4 \rightarrow$ diphenyl-3-carboxylic acid. $HNO_3 \rightarrow$ 4-nitro deriv.

See first reference above and also

Gomberg, Pernert, *J. Am. Chem. Soc.*, 1926, 48, 1379.

Perrier, *Bull. soc. chim.*, 1892, 7, 181.

Jacobson, *Ber.*, 1895, 28, 2546.

4-Methyldiphenyl (*Phenyl-p-tolyl*, *p-phenyl-toluene*).

Plates from MeOH or ligroin. M.p. $49-50^{\circ}$ ($47-8^{\circ}$). B.p. $267-8^{\circ}$, $134-6^{\circ}/15$ mm. Dil. HNO_3 or $KMnO_4 \rightarrow$ diphenyl-4-carboxylic acid. $CrO_3 \rightarrow$ terephthalic acid. Br in $CCl_4 \rightarrow$ 4'-bromo deriv. $HNO_3 \rightarrow$ 2-, 3-, and 4'-nitro derivs.

Gomberg, Pernert, *J. Am. Chem. Soc.*, 1926, 48, 1375.

Sherwood, Short, Stansfield, *J. Chem. Soc.*, 1932, 1834.

Kliegl, Huber, *Ber.*, 1920, 53, 1655.

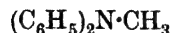
Gattermann, *Ann.*, 1906, 347, 381.

Oddo, Curatolo, *Gazz. chim. ital.*, 1895, 25, 130.

Möhlau, Berger, *Ber.*, 1893, 26, 1997.

Carnelley, *J. Chem. Soc.*, 1880, 37, 706.

N-Methyldiphenylamine (*Diphenylmethylamine*)



$C_{13}H_{13}N$

MW, 183

B.p. $295.5-296.5^{\circ}$ (290° , 282°), $291.7-292.2^{\circ}/740.8$ mm., $175^{\circ}/31$ mm. D_4^1 1.0603, D_{20}^{20} 1.0491, D_4^{20} 1.0476. n_D^{20} 1.61928, $n_D^{24.6}$ 1.6166. Br in

678 2'-Methyldiphenylamine-2-carboxylic Acid

AcOH \rightarrow 4:4'-dibromo-, and 2:4:2':4'-tetrabromo derivs.

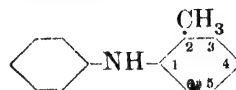
* Girard, *Bull. soc. chim.*, 1875, 23, 2.

Ullmann, *Ann.*, 1903, 327, 113.

Bardy, *Z. Chem.*, 1871, 469.

Wieland, *Ber.*, 1919, 52, 890.

2-Methyldiphenylamine (*N-Phenyl-o-toluidine*, *phenyl-o-tolylamine*)



$C_{13}H_{13}N$

MW, 183

M.p. 41° (38°). B.p. $305^{\circ}/727.5$ mm. Violet-blue col. with HNO_3 .

Merz, Paschkowezky, *J. prakt. Chem.*, 1893, 48, 461.

Ullmann, *Ann.*, 1907, 355, 324.

Société anonyme pour l'industrie chimique à Bâle, E.P., 250,819, (*Chem. Abstracts*, 1927, 21, 1273).

3-Methyldiphenylamine (*N-Phenyl-m-toluidine*, *phenyl-m-tolylamine*).

M.p. 30° . B.p. $315^{\circ}/724$ mm. Sol. EtOH, Et_2O , C_6H_6 . Green col. with HNO_3 in H_2SO_4 .

Zega, Buch, *J. prakt. Chem.*, 1886, 33, 542.

Ullmann, *Ann.*, 1907, 355, 325.

4-Methyldiphenylamine (*N-Phenyl-p-toluidine*, *phenyl-p-tolylamine*).

Cryst. M.p. 89° (87°). B.p. 334° , $317-18^{\circ}/727.5$ mm., $316.6^{\circ}/704$ mm. Blue col. with HNO_3 . Br in AcOH \rightarrow tetrabromo deriv.

N-Acetyl: cryst. from EtOH. M.p. 52° .

Hofmann, *Ann.*, 1864, 132, 291.

de Laire, Girard, Chapotaut, *Ann.*, 1866, 140, 347.

Merz, Paschkowezky, *J. prakt. Chem.*, 1893, 48, 455.

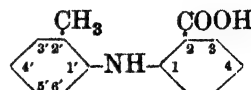
Buch, *Ber.*, 1884, 17, 2634.

Goldberg, Sissoeff, *Ber.*, 1907, 40, 4543.

Ullmann, *Ann.*, 1907, 355, 325.

Chapman, *J. Chem. Soc.*, 1929, 2136.

2'-Methyldiphenylamine-2-carboxylic Acid (*N-o-Tolylantranilic acid*, *2-o-toluidinobenzoic acid*)



$C_{14}H_{13}O_2N$

MW, 227

3'-Methyldiphenylamine-2-carboxylic Acid 679

Leaflets from C_6H_6 . M.p. 179° ($188-9^\circ$). Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin. Insol. dil. acids. Violet sol. in conc. H_2SO_4 . Heat to $230^\circ \rightarrow$ 2-methyldiphenylamine.

Locher, *Ann.*, 1894, 279, 277.

Höchstler Farbewerke, D.R.P., 145,189, (*Chem. Zentr.*, 1903, II, 1097).

3'-Methyldiphenylamine-2-carboxylic Acid (N-m-Tolylantranilic acid, 2-m-toluidinobenzoic acid).

Leaflets from C_6H_6 . M.p. 139° . Sol. EtOH, Et_2O , AcOH, C_6H_6 . Spar. sol. ligroin. Insol. H_2O . Sol. conc. $H_2SO_4 \rightarrow$ yellow sol. with green fluor. Dist. \rightarrow 3-methyldiphenylamine.

Ullmann, Bader, *Ann.*, 1907, 355, 324.

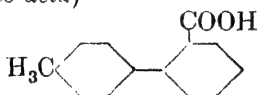
4'-Methyldiphenylamine-2-carboxylic Acid (N-p-Tolylantranilic acid, 2-p-toluidinobenzoic acid).

Needles from EtOH. M.p. $191-2^\circ$ (196°). Sol. EtOH, Et_2O , C_6H_6 . Heat \rightarrow 4-methyldiphenylamine.

Höchstler Farbewerke, D.R.P., 145,189, (*Chem. Zentr.*, 1903, II, 1097).

Ullmann, Bader, *Ann.*, 1907, 355, 325.

4'-Methyldiphenyl-2-carboxylic Acid (2-p-Tolylbenzoic acid)

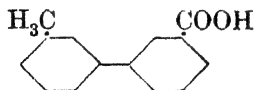


$C_{14}H_{12}O_2$ MW, 212

M.p. $179-80^\circ$ (173°). Sol. hot EtOH. Insol. H_2O , cold EtOH.

Carnelly, *J. Chem. Soc.*, 1877, 32, 655.

3'-Methyldiphenyl-3-carboxylic Acid (3-m-Tolylbenzoic acid)

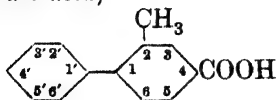


$C_{14}H_{12}O_2$ MW, 212

Needles from EtOH. M.p. 204° . Sol. Et_2O , $CHCl_3$. Spar. sol. H_2O .

Perrier, *Bull. soc. chim.*, 1892, 7, 183.

2-Methyldiphenyl-4-carboxylic Acid (6-Phenyl-m-toluic acid)



$C_{14}H_{12}O_2$ MW, 212

Leaflets from pet. ether. M.p. $169-70^\circ$. Sol. MeOH, EtOH, AcOH. Spar. sol. Et_2O .

2-Methyl-4 : 6-diphenylpyridine

Me ester : $C_{15}H_{14}O_2$. MW, 226. Leaflets from MeOH. M.p. $61-3^\circ$.

Auwers, Jülicher, *Ber.*, 1922, 55, 2183.

4'-Methyldiphenyl-4-carboxylic Acid (4-p-Tolylbenzoic acid).

M.p. $243-4^\circ$ decomp. Sol. Et_2O . Spar. sol. H_2O , EtOH.

Carnelly, *J. Chem. Soc.*, 1877, 32, 654.

N-Methyldiphenylformamidine



$C_{14}H_{14}N_2$ MW, 210

Bright yellow oil. B.p. $218-19^\circ/26$ mm. Sol. most org. solvents.

B, HCl : m.p. 228° .

B, H_2AuCl_4 : m.p. 145° .

Wheeler, Johnson, *Am. Chem. J.*, 1898, 20, 859.

N-Methyl-2 : 6-di- $[\beta$ -phenylethyl]-piperidine.

See Lobelan.

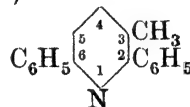
Methyldiphenylmethane.

See Phenyltolylmethane.

α -Methyldiphenylmethane.

See unsym.-Diphenylethane.

3-Methyl-2 : 6-diphenylpyridine (2 : 6-Diphenyl- β -picoline)



$C_{18}H_{15}N$ MW, 245

Yellow oil. B.p. $253-5^\circ/25$ mm.

$B, HCl, 2HgCl_2$: needles from H_2O . M.p. 160° .

Scholtz, *Ber.*, 1899, 32, 1939.

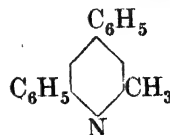
4-Methyl-2 : 6-diphenylpyridine (2 : 6-Diphenyl- γ -picoline).

Needles from ligroin. M.p. $72-3^\circ$. Weakly basic.

B, HNO_3 : needles. M.p. 185° .

Dilthey, *J. prakt. Chem.*, 1916, 94, 74.

2-Methyl-4 : 6-diphenylpyridine (4 : 6-Diphenyl- α -picoline)



$C_{18}H_{15}N$ MW, 245

Cryst. from ligroin. M.p. 73° .

B.HNO₃: needles from dil. *HNO₃*. M.p. 185°. Very sol. *H₂O*.

Gastaldi, *Gazz. chim. ital.*, 1922, **52**, i, 169.

Methyldiphenyl sulphide.

See Phenyl tolyl sulphide.

Methyldiphenyl sulphone.

See Phenyl tolyl sulphone.

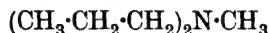
Methyldipropenyl.

See 2-Methyl-2:4-hexadiene and 3-Methyl-2:4-hexadiene.

Methyldipropylacetic Acid.

See 1-Methyl-1-propyl-*n*-valeric Acid.

Methyldipropylamine



C₇H₁₇N MW, 115

B.p. 117° (113–14°).

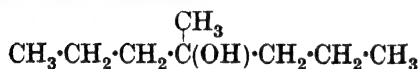
B.HCl: hygroscopic cryst.

B₂H₂PtCl₆: orange-red cryst. M.p. above 200°.

v. Braun, *Ber.*, 1900, **33**, 1446.

Passon, *Ber.*, 1891, **24**, 1680.

Methyldipropylcarbinol (4-Methylheptanol-4, 4-hydroxy-4-methylheptane)



C₈H₁₈O MW, 130

B.p. 161.5°, 159–61°/755 mm., 61–3°/12 mm. *D₄²⁰* 0.82479. Heat of comb. *C_p* 1246.4 Cal. *CrO₃* → mainly acetic and propionic acids.

Acetyl: b.p. 174–6°/759.3 mm. *D₀⁰* 0.8738, *D₂₀⁰* 0.8588.

Gortalow, Saizew, *J. prakt. Chem.*, 1886, **33**, 203.

Halse, *J. prakt. Chem.*, 1914, **89**, 453.

Stadnikow, *Ber.*, 1914, **47**, 2137.

Methyldithiocarbamic Acid (N-Methyl-aminodithioformic Acid)



C₂H₅NS₂ MW, 107

Free acid not isolated.

Me ester: *C₃H₇NS₂*. MW, 121. B.p. 155–6°/20 mm. Alc. *NH₃* at 100° → methyl mercaptan + methylthiourea.

Et ester: methyldithiourethane. *C₄H₉NS₂*. MW, 135. M.p. 30–2°. B.p. 103–4°/3 mm.

Methylamine salt: m.p. 114–15° decomp.

Freund, Asbrand, *Ann.*, 1895, **285**, 175.

Delépine, *Bull. soc. chim.*, 1908, **3**, 641.

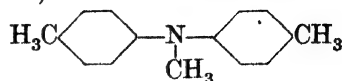
Delépine, Schving, *Bull. soc. chim.*, 1910, **7**, 896.

Bodendorf, *J. prakt. Chem.*, 1930, **126**, 233.

Methyldithiourethane.

See under Methyldithiocarbamic Acid.

N-Methyl-4:4'-ditolylamine (Di-*p*-tolyl-methylamine)



C₁₅H₁₇N MW, 211

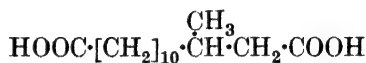
B.p. 235–40°/20 mm. Does not form salts.

Girard, *Bull. soc. chim.*, 1875, **24**, 120.

1-Methyldivinyl.

See 1:3-Pentadiene.

2-Methyldodecane-1:12-dicarboxylic Acid



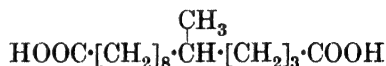
C₁₅H₂₈O₄ MW, 272

Cryst. from EtOH. M.p. 75.2°. B.p. 239–41°/4 mm. Sol. *Et₂O*, hot *C₆H₆*.

Dinitrile: *C₁₅H₂₆N₂*. MW, 234. B.p. 229–32°/16 mm. *D₁₅⁰* 0.901.

Chuit *et al.*, *Helv. Chim. Acta*, 1927, **10**, 178.

4-Methyldodecane-1:12-dicarboxylic Acid



C₁₅H₂₈O₄ MW, 272

Cryst. from *C₆H₆*–pet. ether. M.p. 74–5°.

Ruzicka, Steiger, *Helv. Chim. Acta*, 1927, **10**, 689.

Methyldodecanol.

See 2-Methyldodecyl Alcohol and Methyleneethylnonylcarbinol.

2-Methyldodecyl Alcohol (2-Methyldodecanol-1)



C₁₃H₂₈O MW, 200

l.

B.p. 105°/1.4 mm. *[α]_D²⁵* +2.34°.

Levene, Mikeska, *J. Biol. Chem.*, 1929, **84**, 587.

Methylene acetate.

See Methylene diacetate.

Methyleneacetone.

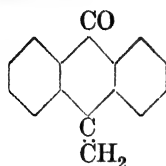
See Methyl vinyl Ketone.

3-Methyleneallyl Alcohol.

See 4-Hydroxy-1:2-butadiene.

Methyleneaniline.

See Anhydroformaldehydeaniline.

Methylene-anthrone $C_{15}H_{10}O$

MW, 206

Yellow prisms from ligroin. M.p. 148°. Sol. MeOH, AcOH, C_6H_6 , $CHCl_3$.Meyer, *Ann.*, 1920, 420, 135.**Methylene benzoate.**

See Methylene dibenzoate.

Methylene bromide (Dibromomethane) CH_2Br_2

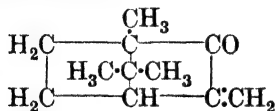
MW, 174

F.P. — 52.7°. B.p. 96.95°. D_4^{15} 2.80986, D_{16}^{15} 2.4985, D_{25}^{25} 2.47745. 100 gm. H_2O dissolve 1.173 gm. at 0°, 1.146 gm. at 10°, 1.148 gm. at 20°, 1.176 gm. at 30°. n_D^{15} 1.54463.Perkin, *J. Chem. Soc.*, 1884, 45, 520.Hartman, Dreger, *Organic Syntheses*, 1929, IX, 56.**Methylene bromiodide.**

See Bromiodomethane.

1-Methylenebutrylic Acid.

See 1-Ethylacrylic Acid.

Methylenecamphor $C_{11}H_{16}O$

MW, 164

Cryst. M.p. 43.5–44°. B.p. 218°. $[\alpha]_D^{20} + 127.5^\circ$ in EtOH. Very sol. most org. solvents. Polymerises on repeated dist.Rupe, Akermann, Takagi, *Helv. Chim. Acta*, 1918, 1, 468.Minguin, *Compt. rend.*, 1903, 136, 752.**Methylene chloride (Dichloromethane)** CH_2Cl_2

MW, 85

F.P. — 96.8°. B.p. 39.95° (40–1°). D_4^{15} 1.33479. n_D^{15} 1.42721.I.C.I., U.S.P., 1,918,624, (*Chem. Abstracts*, 1933, 27, 4816).Panizzon, *Helv. Chim. Acta*, 1932, 15, 1191.Thorpe, *J. Chem. Soc.*, 1880, 37, 194.**Methylene chlorobromide.**

See Chlorobromomethane.

Methylene cyanide.

See Malonitrile.

3-Methylene-1-decylene.

See Heptoprene.

Methylenediacetamide.

See Diacetylmethylenediamine.

Methylene diacetate (*Diacetoxymethane, methylene acetate*) $C_5H_8O_4$

MW, 132

B.p. 169–71°/745 mm., 62–4°/11 mm. D_{20}^{20} 1.136. Misc. in all proportions with Et_2O , EtOH. Spar. sol. H_2O .Descude, *Ann. chim.*, 1902, 29, 513.Wegscheider, Späth, *Monatsh.*, 1915, 36, 33.Knoevenagel, *Ann.*, 1914, 402, 127.**Methylenedianiline.**

See Diphenylmethylenediamine.

Methylene dibenzoate (*Dibenzoyloxy-methane, methylene benzoate*) $C_{15}H_{12}O_4$

MW, 256

Prisms from Et_2O . M.p. 99°. B.p. 225° decomp. Sol. Et_2O , Me_2CO , C_6H_6 , CCl_4 . Spar. sol. EtOH, pet. ether. Insol. H_2O .Wegscheider, Späth, *Monatsh.*, 1909, 30, 859.**Methylene-dicotoin.**

See Fortoin.

Methylene diethyl Ether.

See under Formaldehyde.

Methylene dimethyl Ether.

See Methylal.

Methylenedioxyacetanilide.

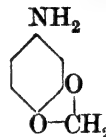
See under Methylenedioxyaniline.

3 : 4-Methylenedioxyacetophenone.

See Acetopiperone.

Methylenedioxy-allylbenzene.

See Safrol.

3 : 4-Methylenedioxyaniline (*4-Aminobenzodioxole, 4-aminocatechol methylene ether*) $C_7H_7O_2N$

MW, 137

Needles from pet. ether. M.p. 44° (44–6°). B.p. 144°/16 mm. Sol. EtOH, Et_2O , $CHCl_3$.

C_6H_6 . Spar. sol. pet. ether, cold H_2O . Volatile in steam with part. decomp.

B, HCl : m.p. 210° decomp.

B_2, H_2SO_4 : needles from H_2O or EtOH. M.p. 250° decomp.

N-Acetyl: 3 : 4-methylenedioxyacetanilide. Needles from H_2O . M.p. 135° . Sol. EtOH, Et_2O , C_6H_6 .

Picrate: m.p. $192-5^\circ$ decomp. after darkening at 188° .

Rupe, Majewski, *Ber.*, 1900, 33, 3403.

Methylenedioxybenzaldehyde.

See Piperonal.

Methylenedioxybenzene.

See under Catechol.

Methylenedioxybenzoic Acid.

See Piperonylic Acid.

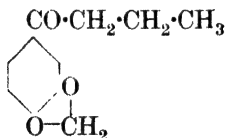
3 : 4-Methylenedioxybenzylacetone.

See Piperonylacetone.

3 : 4-Methylenedioxybenzyl Alcohol.

See Piperonyl Alcohol.

3 : 4-Methylenedioxybutrophenone



$C_{11}H_{12}O_3$

MW, 192

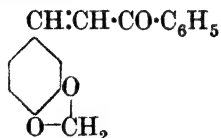
Cryst. from EtOH-pet. ether. M.p. 47° . Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. AcOH, ligroin.

Oxime: cryst. from EtOH. M.p. 75° . Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O .

Semicarbazone: needles from EtOH.Aq. M.p. $193-4^\circ$.

Mameli, Alagna, *Gazz. chim. ital.*, 1906, 36, i, 137.

3 : 4-Methylenedioxychalkone (ω -Piperonylideneacetophenone)



$C_{16}H_{12}O_3$

MW, 252

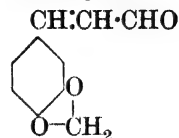
Yellow needles from EtOH. M.p. 122° . Sol. conc. $H_2SO_4 \rightarrow$ orange-yellow sol.

Semicarbazone: m.p. $203-5^\circ$.

Picrate: orange needles. M.p. $126-8^\circ$.

v. Kostanecki, Schneider, *Ber.*, 1896, 29, 1892.

3 : 4 - Methylenedioxcinnamaldehyde (Piperonylidene-acetaldehyde)



$C_{10}H_8O_3$

MW, 176

Cryst. from pet. ether. M.p. $84.5-85.5^\circ$. Sol. most org. solvents.

Oxime: exists in three forms. (i) Needles from C_6H_6 . M.p. 195° . (ii) Plates from EtOH. M.p. 191° . (iii) Needles from C_6H_6 . M.p. 155° .

Semicarbazone: cryst. from Py. M.p. 234° (226°).

Phenylhydrazone: yellow needles from EtOH. M.p. $163-4^\circ$ (160°).

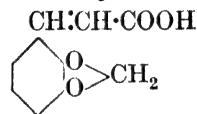
Anil: yellow needles from EtOH. M.p. 118° .

Winzheimer, *Ber.*, 1908, 41, 2380.

Angeli, Alessandri, Pegna, *Atti accad.*

Lincei, 1910, 19, 657.

2 : 3-Methylenedioxcinnamic Acid



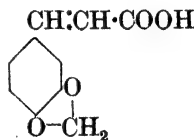
$C_{10}H_8O_4$

MW, 192

Prisms from MeOH.Aq. or AcOEt. M.p. 194° . Spar. sol. H_2O .

Perkin, Trikojus, *J. Chem. Soc.*, 1926, 2932.

3 : 4 - Methylenedioxcinnamic Acid (Piperonylidene-acetic acid)



$C_{10}H_8O_4$

MW, 192

(i) High melting form.

Needles from EtOH. M.p. 242° . Very sol. EtOH, Et_2O . Spar. sol. H_2O . $k = 2.5 \times 10^{-5}$ at 25° .

Me ester: $C_{11}H_{10}O_4$. MW, 206. Plates from MeOH. M.p. $133-4^\circ$.

Et ester: $C_{12}H_{12}O_4$. MW, 220. Needles from EtOH. M.p. $67-8^\circ$. B.p. $190-2^\circ/12$ mm.

Amide: $C_{10}H_8O_3N$. MW, 191. Needles from EtOH. M.p. 180° . N-Butyl: cryst. from pet. ether- C_6H_6 . M.p. $85-6^\circ$. N-sec.-Butyl: needles from EtOH. M.p. $161-2^\circ$. N-Isobutyl:

see Fagaramide. N-tert.-Butyl : yellow prisms from EtOH. M.p. 138-9°.

Anilide : plates from EtOH. M.p. 158°.

(ii) Low melting form, allo-form.

Cryst. from CS₂. M.p. 99-100°. Sol. to 5.9% in C₆H₆ at 18°. $k = 11.0 \times 10^{-5}$ at 25°.

Aniline salt : cryst. from H₂O. M.p. 83.5-84°.

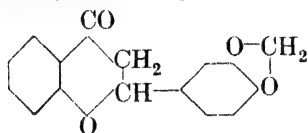
Amide : plates from Et₂O. M.p. 131°.

Thoms, Thümen, *Ber.*, 1911, **44**, 3721.

Roth, Stoermer, *Ber.*, 1913, **46**, 272.

Posner, *J. prakt. Chem.*, 1910, **82**, 434.

3' : 4'-Methylenedioxyflavanone



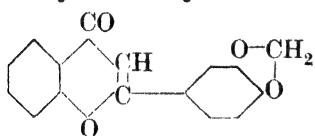
C₁₆H₁₂O₄ MW, 268

Needles from CS₂. M.p. 127-8°. Red sol. in conc. H₂SO₄.

Hattori, *Bull. Chem. Soc. Japan*, 1927, **2**, 171.

Ryan, Cruess-Callaghan, *Proceedings of the Royal Irish Academy*, 1929, **39**, 124.

3' : 4'-Methylenedioxyflavone



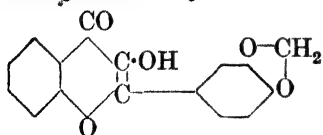
C₁₆H₁₀O₄ MW, 266

Faintly yellow needles from ligroin. M.p. 206° (200-1°). Spar. sol. EtOH. Yellow sol. in conc. H₂SO₄. No col. with FeCl₃.

See first reference above and also

Auwers, Anschütz, *Ber.*, 1921, **54**, 1558.

3' : 4'-Methylenedioxyflavonol



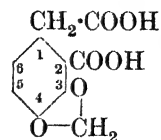
C₁₆H₁₀O₅ MW, 282

Pale yellow needles from EtOH. M.p. 214-15°. Reddish-brown sol. in conc. H₂SO₄. FeCl₃ → brownish-violet col.

Me ether : C₁₇H₁₂O₅. MW, 296. Prisms from MeOH. M.p. 155°.

Hattori, *Bull. Chem. Soc. Japan*, 1927, **2**, 171.

3 : 4-Methylenedioxyhomophthalic Acid



C₁₀H₈O₆

MW, 224

Plates from H₂O. M.p. 203-4° decomp.

Anhydride : C₁₀H₆O₅. MW, 206. Plates from C₆H₆. M.p. 195°.

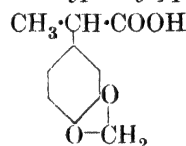
Haworth, Perkin, Stevens, *J. Chem. Soc.*, 1926, 1769.

4 : 5-Methylenedioxyhomophthalic Acid.

Needles from H₂O. M.p. 236° decomp.

Perkin, Robinson, *J. Chem. Soc.*, 1907, **91**, 1086.

3 : 4-Methylenedioxyhydratropic Acid (α-[3 : 4-Methylenedioxyphenyl]-propionic acid)



C₁₀H₁₀O₄

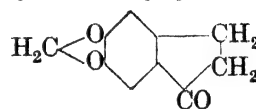
MW, 194

Needles from H₂O. M.p. 80°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Insol. pet. ether, cold H₂O. Amide : C₁₀H₁₁O₃N. MW, 193. Cryst. from H₂O. M.p. 124°.

Hoering, *Ber.*, 1908, **41**, 3082.

Bougault, *Bull. soc. chim.*, 1901, **25**, 857.

5 : 6-Methylenedioxyhydrindone-1



C₁₀H₈O₃

MW, 176

Leaflets from EtOH. M.p. 161°. Sol. EtOH, AcOH, AcOEt, boiling C₆H₆. Spar. sol. pet. ether. Sol. conc. H₂SO₄ with cherry-red col. Dil. HNO₃ → hydraetic acid.

Oxime : prisms from MeOH. Decomp. about 246°.

Semicarbazone : m.p. 253°. Prac. insol. EtOH.

Isonitroso deriv. : yellow needles from EtOH. Decomp. about 230°.

2-Benzylidene : yellow prisms from EtOH. M.p. 200°.

Perkin, Robinson, *J. Chem. Soc.*, 1907, **91**, 1084.

Borsche, Eberlein, *Ber.*, 1914, **47**, 1469.

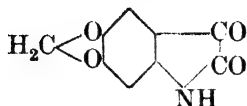
3 : 4-Methylenedioxyhydrocinnamic Acid

684

3 : 4 - Methylenedioxyhydrocinnamic Acid.

See Piperonylacetic Acid.

5 : 6-Methylenedioxyisatin



$C_9H_5O_4N$

MW, 191

Crimson needles from H_2O . M.p. 284° decomp. Sol. AcOH. Mod. sol. H_2O , EtOH. Sol. conc. H_2SO_4 with blue col. \rightarrow red on addition of H_2O .

Gulland, Robinson, Scott, Thornley, *J. Chem. Soc.*, 1929, 2931.

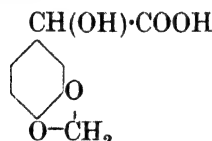
Methylenedioxyisopropyl Alcohol.

See 1 : 3-Methylene-glycerol.

3 : 4 - Methylenedioxy - 1 - γ - ketobutylbenzene.

See Piperonylaceton.

3 : 4-Methylenedioxymandelic Acid (α -Hydroxyhomopiperonylic acid)



$C_9H_8O_5$

MW, 196

Plates from EtOH.Aq. M.p. 162° (156°). Sol. H_2O , Et₂O. Spar. sol. C_6H_6 . Sol. conc. H_2SO_4 with violet col.

Et ester: $C_{11}H_{12}O_5$. MW, 224. Needles from xylene. M.p. 72° . B.p. $197^\circ/15\text{ mm.}$, $179-81^\circ/8\text{ mm.}$

Amide: $C_9H_9O_4N$. MW, 195. Plates from EtOH-AcOEt. M.p. 140° . Sol. H_2O . O-Acetyl: rods from EtOH. M.p. 143° .

Nitrile: piperonal cyanhydrin. $C_9H_7O_3N$. MW, 177. Liq. O-Acetyl: plates from EtOH. M.p. 71° . Sol. C_6H_6 . Insol. ligroin. O-Benzoyl: cryst. from EtOH. M.p. 57° .

Acetyl: prisms from H_2O or EtOH. M.p. 161° .

Anilide: needles. M.p. 114° . O-Benzoyl: cryst. from C_6H_6 . M.p. 160° .

Barger, Ewins, *J. Chem. Soc.*, 1909, 95, 554.

Albert, *Ber.*, 1916, 49, 1384.

Passerini, *Gazz. chim. ital.*, 1924, 54, 538.

4 : 5-Methylenedioxy-2- β -methylaminoethylbenzaldehyde.

See Hydrastinine.

7 : 8-Methylenedioxyquinoline

3 : 4 - [Methylenedioxy - 6 - methylcarbonyl]-benzoylformic Acid.

See Hydrastininic Acid.

6 : 7-Methylenedioxy-2-methylnaphthalene.

See Podophyllomerol.

6 : 7 - Methylenedioxy - N - methyltetrahydroisoquinoline.

See Hydrohydrastinine.

3 : 4-Methylenedioxyphenylacetaldehyde.

See Homopiperonal.

3 : 4-Methylenedioxyphenylacetic Acid.

See Homopiperonylic Acid.

Methylenedioxyphenylbutadiene - carbonylic Acid.

See Piperic Acid and Isopiperic Acid.

Methylenedioxyphenylbutylene - carbonylic Acid.

See Hydropiperic Acid.

2 - [3 : 4 - Methylenedioxyphenylethyl] - acrylic Acid.

See β -Hydropiperic Acid.

2-[3 : 4 - Methylenedioxyphenyl] - ethyl Alcohol.

See Homopiperonyl Alcohol.

2-[3 : 4 - Methylenedioxyphenyl] - ethylamine.

See Homopiperonylamine.

3 : 4 - Methylenedioxyphenylethylidene - propionic Acid.

See α -Hydropiperic Acid.

3 : 4 - Methylenedioxyphenylpropenyl - acetic Acid.

See α -Hydropiperic Acid.

Methylenedioxyphenylvinylacrylic Acid.

See Piperic Acid and Isopiperic Acid.

4 : 5-Methylenedioxyphthalic Acid.

See Hydrastic Acid.

4 : 5-Methylenedioxyphthalimide.

See under Hydrastic Acid.

Methylenedioxy-propenylbenzene.

See Isosafrol.

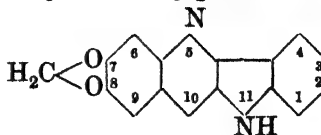
3 : 4-Methylenedioxypropiophenone.

See Propiopiperone.

Methylenedioxypropyl Alcohol.

See 1 : 2-Methylene-glycerol.

7 : 8-Methylenedioxyquinoline



$C_{16}H_{10}O_2N_2$

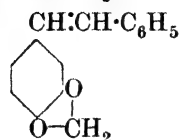
MW, 262

Yellow prisms from Py. M.p. 280° . Readily sol. hot Py, hot $PhNO_2$. Mod. sol. hot EtOH, toluene. Spar. sol. C_6H_6 , pet. ether. Alc. sol.

shows violet fluor. Sol. conc. H_2SO_4 to yellow sol. with blue fluor.

Gulland, Robinson, Scott, Thornley, *J. Chem. Soc.*, 1929, 2935.

• **3 : 4-Methylenedioxy stilbene**

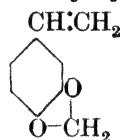


$\text{C}_{15}\text{H}_{12}\text{O}_2$ MW, 224

Needles from EtOH. M.p. 95–6°.

Dey, Row, *Quart. J. Indian Chem. Soc.*, 1925, 1, 286.

3 : 4-Methylenedioxy styrene



$\text{C}_9\text{H}_8\text{O}_2$ MW, 148

Oil. B.p. 223–5°, 108–9°/20–2 mm., 107–8°/15 mm. D_4^{18} 1.1488. n_D 1.5802. Sol. EtOH, Et_2O , CHCl_3 , C_6H_6 . Volatile in steam.

Böttcher, *Ber.*, 1909, 42, 256.

Pauly, Neukam, *Ber.*, 1908, 41, 4155.

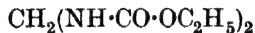
Methylenediphenyldiamine.

See Diphenylmethylenediamine.

2-Methylene-1 : 2-diphenyl-lactic Acid.

See 1-Hydroxy-1 : 2-diphenylvinylacetic Acid.

Methylenediurethane (Dicarbethoxymethyl-enediamine)



$\text{C}_7\text{H}_{14}\text{O}_4\text{N}_2$ MW, 190

Cryst. from EtOH or C_6H_6 . M.p. 131°. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Conrad, Hock, *Ber.*, 1903, 36, 2206.

1-Methylene-4-ethylidene-2-butylene.

See 1 : 3 : 5-Heptatriene.

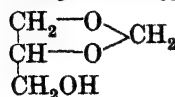
Methylene fluorobromide.

See Fluorobromomethane.

1-Methyleneglutaric Acid.

See 1-Butylene-2 : 4-dicarboxylic Acid.

1 : 2-Methylene-glycerol (Glycerol 1 : 2-methylene ether, methylenedioxypropyl alcohol)



$\text{C}_4\text{H}_8\text{O}_3$ MW, 104

B.p. 195°, 104°/28 mm., 84–5°/11 mm. D_4^{20} 1.2113. n_D^{20} 1.4477.

Me ether : $\text{C}_5\text{H}_{10}\text{O}_3$. MW, 118. Mobile liq. B.p. 147°. D_4^{20} 1.0788. n_D^{20} 1.4213.

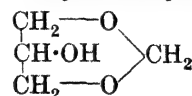
Benzoyl : prisms. M.p. 26°. B.p. 172–5°/15 mm. n_D^{20} 1.5184.

Phenylurethane : m.p. 72°.

Hibbert, Carter, *J. Am. Chem. Soc.*, 1928, 50, 3120.

van Roon, *Rec. trav. chim.*, 1929, 48, 186.

1 : 3-Methylene-glycerol (Glycerol 1 : 3-methylene ether, methylenedioxyisopropyl alcohol)



$\text{C}_4\text{H}_8\text{O}_3$ MW, 104

Slightly viscous, hygroscopic liq. B.p. 191°, 100°/28 mm., 82°/11 mm. D_4^{20} 1.2256. n_D^{20} 1.4533.

Me ether : b.p. 152°. n_D^{20} 1.4295.

Benzoyl : needles. M.p. 74.6° (72°).

Phenylurethane : needles from EtOH. M.p. 133°.

See above references.

Methylene iodide (Di-iodomethane)



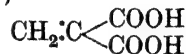
CH_2I_2 MW, 268

M.p. 6°. B.p. 181° part. decomp., 106–7°/70 mm., 66–70°/11–12 mm. $D_{12.2}^{12.2}$ 3.3394, D_{15}^{15} 3.3326. $n_D^{10.5}$ 1.7559. 100 gm. H_2O dissolve 1.565 gm. at 0°, 1.446 gm. at 10°, 1.419 gm. at 20°, 1.420 gm. at 30°.

Adams, Marvel, *Organic Syntheses*, Collective Vol. I., 350.

Perkin, *J. Chem. Soc.*, 1896, 69, 1173.

Methylenemalonic Acid (Ethylene-1 : 1-dicarboxylic acid)



$\text{C}_4\text{H}_4\text{O}_4$ MW, 116

Does not exist in free state.

Di-Me ester : $\text{C}_8\text{H}_8\text{O}_4$. MW, 144. B.p. 200–3°. Polymerises readily.

Di-Et ester : $\text{C}_8\text{H}_{12}\text{O}_4$. MW, 172. B.p. 208–10°. Polymerises readily to hard mass, sintering at 225°, decomp. at 240–50° (meta polymer). A further polymer (para) has m.p. 154–6°. Sol. hot AcOH. Spar. sol. EtOH, Et_2O , pet. ether, C_6H_6 . Insol. H_2O .

Haworth, Perkin, *J. Chem. Soc.*, 1898, 73, 341.

Meerwein, Schurmann, *Ann.*, 1913, 398, 214.

Methylene β -propylene dioxide.

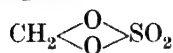
See 1 : 3-Dioxan.

1-Methylene-3-propylidene-propane.

See 1 : 4-Heptadiene.

Methylene-succinic Acid.

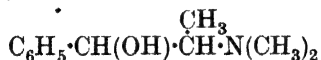
See Itaconic Acid.

Methylene sulphateCH₂O₄S MW, 110

White amorph. powder. M.p. about 155° decomp. Sol. Me₂CO. Insol. H₂O, EtOH, Et₂O, CHCl₃, C₆H₆.

Délépine, *Compt. rend.*, 1899, **129**, 831.**Methyleneurea (Carbonylmethylenediamine)**C₂H₄ON₂ MW, 72

Very difficultly sol. powder. M.p. above 230°. Hyd. by min. acids.

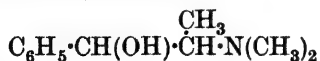
Dixon, Taylor, *J. Chem. Soc.*, 1916, **109**, 1254.**N-Methylephedrine (α -Hydroxy- β -dimethylaminopropylbenzene)**C₁₁H₁₇ON MW, 179*l.*

Needles from MeOH. M.p. 87–8°. [α]_D – 29.2° in MeOH.

B.HCl: tablets from EtOH. M.p. 188–9°. [α]_D – 29.8° in H₂O. Sol. H₂O, EtOH. Spar. sol. Me₂CO.

Methiodide: tablets from EtOH. M.p. 212–13°. [α]_D – 21.8°.

Picrate: cryst. from EtOH. M.p. 144°.

Smith, *J. Chem. Soc.*, 1927, 2056.**N-Methyl- ψ -ephedrine (α -Hydroxy- β -dimethylaminopropylbenzene)**C₁₁H₁₇ON MW, 179*d.*

Cryst. from pet. ether. M.p. 30°. [α]_D + 48.1°. Readily sol. most org. solvents. Spar. sol. H₂O.

Methiodide: cryst. from EtOH. M.p. 216–17°.

Picrate: cryst. from EtOH. M.p. 152–3°.

See previous reference.

2-Methylerythrene.

See Isoprene.

N-Methylethanolamine.

See 2-Methylaminoethyl Alcohol.

Methyl Ether.

See Dimethyl Ether.

Methyl-2-ethoxyethyl-amine.

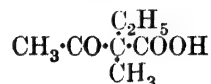
See 2-Methylaminodiethyl Ether.

Methyl ethoxyphenyl Ketone.

See under Hydroxyacetophenone.

Methylethylacetic Acid.

See 1-Methylbutyric Acid.

1-Methyl-1-ethylacetoacetic Acid (1-Methyl-1-acetobutyric acid)C₇H₁₂O₃ MW, 144

Et ester: C₉H₁₆O₃. MW, 172. B.p. 198°, 85°/12 mm. D₄^{17.8} 0.9734. *n*_D^{17.7} 1.426. *Semicarbazone*: cryst. M.p. 122°.

Amide: C₇H₁₃O₂N. MW, 143. Cryst. from H₂O. M.p. 123–4°. Sol. Et₂O, CHCl₃.

James, *Ann.*, 1884, **226**, 209.Meyer, *Monatsh.*, 1906, **27**, 1086.Auwers, *Ber.*, 1913, **46**, 506.**Methylethylacetylene.**

See 2-Pentene.

1-Methyl-2-ethylacrolein (1-Methyl-1-pentenal, 2-propylenepropionaldehyde)C₆H₁₀O MW, 98

B.p. 134–6°/745 mm. D₄²⁵ 0.8544. *n*_D 1.44647.

Oxime: plates from ligroin. M.p. 48–9°. B.p. 193–4°.

Phenylhydrazone: cryst. M.p. 60°. B.p. 171–5°/10.5 mm.

2 : 4-Dinitrophenylhydrazone: carmine cryst. M.p. 159°.

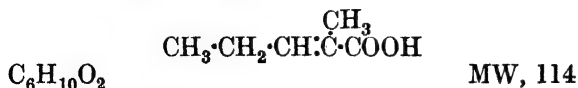
Azine: cryst. M.p. 54–5°. B.p. 150°/20 mm.

Grignard, Abellmann, *Bull. soc. chim.*, 1910, **7**, 642.Auwers, Kreuder, *Ber.*, 1925, **58**, 1979.Ssolonina, *J. Russ. Phys.-Chem. Soc.*, 1887, **19**, 309.**2-Methyl-1-ethylacrylic Acid.**

See 1-Ethylcrotonic Acid.

1-Methyl-2-ethylacrylic Acid (β -Amylene β -carboxylic acid, 2-pentene-2-carboxylic acid, 2-

propylidenepropionic acid, 1-methyl-1-pentenic acid, 1-methyl-1-butylene-1-carboxylic acid



Prisms. M.p. 24.4° (22-3°). B.p. 213°/750 mm., 112°/12 mm. Sol. Et₂O, CHCl₃, CS₂. Spar. sol. H₂O. D_{20}^{25} 0.9812. $k = 1.11 \times 10^{-5}$ at 25°. Volatile in steam.

Et ester: C₈H₁₄O₂. MW, 142. B.p. 167-8°.

Chloride: C₆H₉OCl. MW, 132.5. B.p. 63°/16 mm.

Amide: C₆H₁₁ON. MW, 113. Plates from C₆H₆. M.p. 80°.

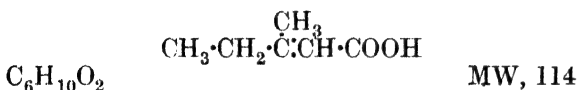
Anilide: needles from C₆H₆-pet. ether. M.p. 84°. *Dibromide*: prisms from CS₂. M.p. 96-7°.

Lieben, Zeisel, *Monatsh.*, 1883, 4, 46.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, 33, 829.

Goldberg, Linstead, *J. Chem. Soc.*, 1928, 2355.

2-Methyl-2-ethylacrylic Acid (*2-Methyl-1-pentenic acid, 2-methyl-1-butylene-1-carboxylic acid, 2-ethylcrotonic acid*)



Trans:

Needles from pet. ether. M.p. 48-9°. B.p. 121-2°/22 mm. Spar. sol. H₂O. $k = 0.74 \times 10^{-5}$ at 25°. Alk. KMnO₄ → methyl ethyl ketone.

Et ester: C₈H₁₄O₂. MW, 142. B.p. 67°/24 mm. $D_{17.9}^{17.9}$ 0.91413. $n_D^{17.9}$ 1.44110.

Chloride: C₆H₉OCl. MW, 132.5. B.p. 85-6°/20 mm.

Amide: C₆H₁₁ON. MW, 113. M.p. 98-9° (94-94.5°).

Nitrile: C₆H₉N. MW, 95. B.p. 162-162.5°/752 mm. D_{20}^{20} 0.83886. n_D^{20} 1.44454.

p-Toluidide: C₁₃H₁₇ON. MW, 203. Needles from C₆H₆-pet. ether. M.p. 66-7°.

Cis:

M.p. 12°. B.p. 96°/5 mm. D_{20}^{20} 0.9830. n_D^{20} 1.4650. $k = 0.71 \times 10^{-5}$ at 25°.

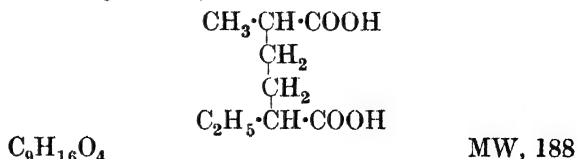
Amide: m.p. 116-116.8°.

Nitrile: b.p. 142-3°/765 mm. D_{20}^{20} 0.82196. n_D^{20} 1.42363.

Bruylants, *Chem. Abstracts*, 1932, 26, 1576.

Kon, Linstead, Wright, *J. Chem. Soc.*, 1934, 602.

1-Methyl-4-ethyladipic Acid (*Heptane-2:5-dicarboxylic acid*)

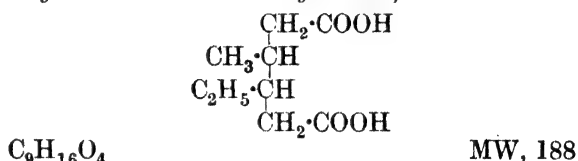


M.p. 58-70°. B.p. 176-8°/0.7 mm. Dist. with FeSO₄ → 3-methyl-4-ethylcyclopentanone.

Dinitrile: 2:5-dicyanoheptane. C₉H₁₄N₂. MW, 150. B.p. 164-6°/13 mm.

v. Braun, Keller, Weissbach, *Ann.*, 1931, 490, 183.

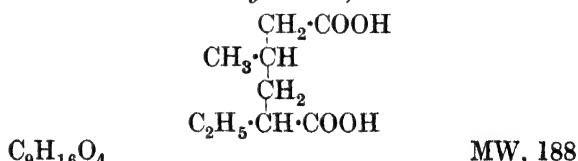
2-Methyl-3-ethyladipic Acid (*2-Methyl-3-ethylbutane-1:4-dicarboxylic acid*)



Di-Et ester: C₁₃H₂₄O₄. MW, 244. B.p. 136-7°/15 mm. n_D^{17} 1.4290.

Cornubert, Borrel, *Bull. soc. chim.*, 1930, 47, 301.

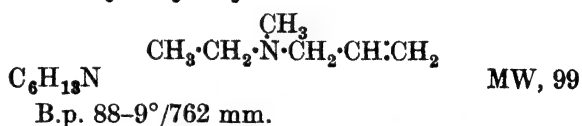
2-Methyl-4-ethyladipic Acid (*2-Methyl-hexane-1:4-dicarboxylic acid*)



M.p. 97-8°. $[\alpha]_D + 13.31^\circ$ in EtOH.

Haller, Desfontaines, *Compt. rend.*, 1905, 140, 1208.

Methylethylallylamine



B.p. 88-9°/762 mm.

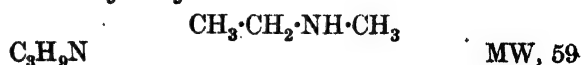
Picrate: pale yellow needles. M.p. 90°.

Meisenheimer, Lohsner, *Ann.*, 1922, 423, 270.

Methylethylallylcarbinol.

See 4-Methyl-1-hexenol-4.

Methylethylamine



B.p. 35° (36–7°).

B,HCl: plates from EtOH–Et₂O. M.p. 126–30°. Very sol. H₂O, EtOH. Sol. CHCl₃. Insol. Et₂O.

B,HBr: plates from EtOH. M.p. 85–8°.

B,HI: needles from EtOH. M.p. 67°.

Aurichloride: needles. M.p. 179–80°.

Platinichloride: prisms. M.p. 207–8°.

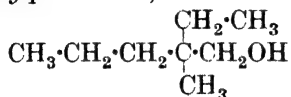
Picrate: yellow needles from EtOH. M.p. 196°.

Meisenheimer, Bernhard, Lohsner, *Ann.*, 1922, 428, 256.

Graymore, *J. Chem. Soc.*, 1931, 1493.

Skraup, Wiegmann, *Monatsh.*, 1889, 10, 107.

2-Methyl-2-ethyl-*n*-amyl Alcohol (2-Methyl-2-ethylpentanol-1)

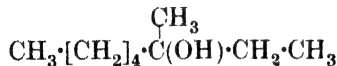


C₈H₁₈O MW, 130

B.p. 75.5–76°. *n*_D²⁰ 1.4353.

Whitmore, Badertscher, *J. Am. Chem. Soc.*, 1933, 55, 1565.

Methylethyl-*n*-amylcarbinol (3-Methyloctanol-3)



C₉H₂₀O MW, 144

dl.

B.p. 97.5°/50 mm., 80–1°/15 mm., 36–7°/3 mm. *D*_F²⁵ 0.8258. *n*_F²⁵ 1.4257, *n*_D²⁰ 1.4315.

Davies, Dixon, Jones, *J. Chem. Soc.*, 1930, 460.

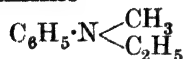
Whitmore, Williams, *J. Am. Chem. Soc.*, 1933, 55, 408.

Green, *J. Am. Chem. Soc.*, 1934, 56, 1167.

Methylethyl-*active*-amylcarbinol.

3 : 5-Dimethylheptanol-3, *q.v.*

Methylethylaniline



C₉H₁₃N MW, 135

B.p. 201°. *D*₄²⁰ 0.9193.

B,HCl: m.p. 114°.

B,HI: plates from EtOH. Sol. H₂O. Sublimes.

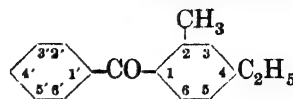
Picrate: yellowish-green prisms. M.p. 134–5°. Sol. EtOH, Et₂O, C₆H₆.

Claus, Howitz, *Ber.*, 1884, 17, 1325.

Methylethylbenzene.

See Ethyltoluene.

2-Methyl-4-ethylbenzophenone



C₁₆H₁₆O MW, 224

B.p. 318–20°.

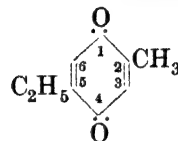
Mailhe, *Bull. soc. chim.*, 1924, 35, 367.

4-Methyl-4'-ethylbenzophenone.

B.p. 215°/10 mm.

Bailar, *J. Am. Chem. Soc.*, 1930, 52, 3600.

2-Methyl-5-ethyl-*p*-benzoquinone



C₉H₁₀O₂ MW, 150

Golden-yellow plates or needles. M.p. 55.3°. Sol. EtOH. Spar. sol. cold H₂O. Volatile in steam.

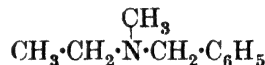
Bayrac, *Bull. soc. chim.*, 1895, 13, 898.

2-Methyl-6-ethyl-*p*-benzoquinone.

Yellow needles from pet. ether. M.p. 40–1°. Sol. most org. solvents.

Jones, Kenner, *J. Chem. Soc.*, 1931, 1853.

Methylethylbenzylamine



C₁₀H₁₅N MW, 149

B.p. 85–7°/10 mm.

Picrate: pale yellow needles from EtOH. M.p. 113°.

Meisenheimer, Lohsner, *Ann.*, 1922, 428, 280.

Methylethylbenzylcarbinol (*α*-Hydroxy-*α*-methylbutylbenzene, 2-hydroxy-1-phenylisopentane, 2-methyl-1-phenylbutanol-2, 2-methyl-1-phenyl-sec.-*n*-butyl alcohol)



C₁₁H₁₆O MW, 164

B.p. 235–8° slight decomp., 215–25°/747 mm. (with loss of H₂O). *D*₄²⁰ 0.9927, *D*₂₀²⁰ 0.9754. *n*_D²⁰ 1.51817.

Konowalow, *J. Russ. Phys.-Chem. Soc.*, 1904, 36, 229, (*Chem. Zentr.*, 1904, I, 1496).

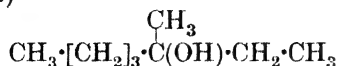
Davies, Kipping, *J. Chem. Soc.*, 1911, 99, 298.

2-Methyl-3-ethylbutane-1 : 4-dicarboxylic Acid 689

2-Methyl-3-ethylbutane-1 : 4-dicarboxylic Acid.

See 2-Methyl-3-ethyladipic Acid.

Methylethylbutylcarbinol (3 - Methyl-heptanol-3)



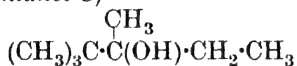
$\text{C}_8\text{H}_{18}\text{O}$ MW, 130

B.p. 163.5°, 158°/745 mm., 64-5°/16 mm. D_4^{20} 0.8446, D_4^{15} 0.8273. n_D^{19} 1.42735.

Allophanate: m.p. 130°. Spar. sol. EtOH, Et₂O.

v. Rissegehm, *Bull. soc. chim. Belg.*, 1930, 39, 369.

Methylethyl-tert.-butylcarbinol (2 : 2 : 3-Trimethylpentanol-3)



$\text{C}_8\text{H}_{18}\text{O}$ MW, 130

B.p. 149-52°/760 mm. Misc. with most org. solvents. Insol. H₂O.

Clarke, Jones, *J. Am. Chem. Soc.*, 1912, 34, 173.

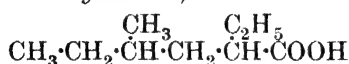
Methylethyl-β-butylene Glycol.

See 2-Methylhexandiol-2 : 4 and 3-Methylhexandiol-2 : 4.

3-Methyl-3-ethylbutyric Acid.

See active-Amylacetic Acid.

3-Methyl-1-ethylcaproic Acid (3-Methyl-heptane-5-carboxylic acid)



$\text{C}_9\text{H}_{18}\text{O}_2$ MW, 158

B.p. 230-2°. D_{25}^{25} 0.9087. n_D^{25} 1.43015.

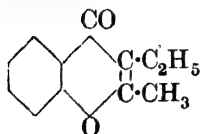
Ester: $\text{C}_{11}\text{H}_{22}\text{O}_2$. MW, 186. B.p. 197-8°. D_{25}^{25} 0.8671. n_D^{25} 1.41885.

Cope, McElvain, *J. Am. Chem. Soc.*, 1932, 54, 4323.

Methylethylcarbinol.

See sec.-n-Butyl Alcohol.

2-Methyl-3-ethylchromone



$\text{C}_{12}\text{H}_{12}\text{O}_2$ MW, 188

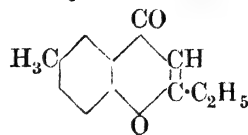
Plates from EtOH.Aq. M.p. 90°. Sol. 25% HCl. Insol. H₂O. Dil. NaOH → salicylic acid + diethyl ketone.

Simonis, Lehmann, *Ber.*, 1914, 47, 696.

Dict. of Org. Comp.—II

2-Methyl-1-ethylcyclohexanol

6-Methyl-2-ethylchromone



$\text{C}_{12}\text{H}_{12}\text{O}_2$ MW, 188

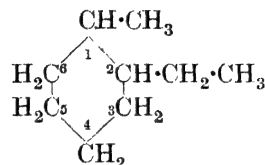
Prisms from pet. ether. M.p. 51°. Sol. conc. H₂SO₄ with weak blue fluor.

Baker, *J. Chem. Soc.*, 1933, 1389.

3-Methyl-3-ethylcrotonic Acid.

See 3-Methyl-1-hexenic Acid.

1-Methyl-2-ethylcyclohexane (Hexahydro-o-ethyltoluene)



C_9H_{18} MW, 126

B.p. 150-2°. D_{20}^{20} 0.784. n_D^{20} 1.432. Misc. with most org. solvents. Insol. H₂O.

Kipping, Perkin, *J. Chem. Soc.*, 1890, 57, 25.

Murat, *Ann. chim.*, 1909, 16, 117.

1-Methyl-3-ethylcyclohexane (Hexahydro-m-ethyltoluene).

l. . .
B.p. 148-9°/743 mm. D_4^{17} 0.7896. n_D^{17} 1.4353. $[\alpha]_D - 2.9^\circ$.

dl. . .
B.p. 145-6°. D^0 0.8320, D^{20} 0.8123. n_D 1.460.

Zelinsky, *Ber.*, 1902, 35, 2680.

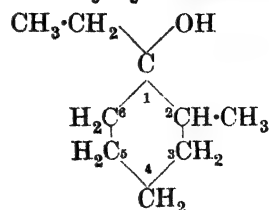
Mailhe, Murat, *Bull. soc. chim.*, 1910, 7, 1084.

1-Methyl-4-ethylcyclohexane (Hexahydro-p-ethyltoluene).

Liq. with fennel-like odour. B.p. 147°. D_4^0 0.8041, D_4^{15} 0.7884. n_D^{15} 1.435.

Sabatier, Mailhe, *Compt. rend.*, 1906, 142, 439.

2-Methyl-1-ethylcyclohexanol



$\text{C}_9\text{H}_{18}\text{O}$

MW, 142
44

3-Methyl-1-ethylcyclohexanol

Liq. with odour resembling camphor. B.p. 181-2°/745 mm. D_4^{20} 0.9235. n_D^{20} 1.458.
Acetyl: b.p. 196-8°. D^0 0.946.

Murat, *Ann. chim. phys.*, 1909, **16**, 116.

3-Methyl-1-ethylcyclohexanol.

d.-

B.p. 80-1°/16 mm. D_4^{20} 0.8995. n_D^{20} 1.4545.
[α]_D + 1.48°.

l.-

B.p. 75.5-76.5°/13 mm. D_4^{20} 0.9098. [α]_D²⁰ - 2.68°.

i.-

B.p. 88°/20 mm. D^{20} 0.9013. n_D 1.459.
Acetyl: b.p. 98-100°/20 mm. D^{20} 0.9303. n_D 1.441.

Phenylurethane: prisms from EtOH. M.p. 98°.

Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1083.

Zelinsky, *Ber.*, 1901, **34**, 2881.

Rupe, Kambli, *Ann.*, 1927, **459**, 209.

4-Methyl-1-ethylcyclohexanol.

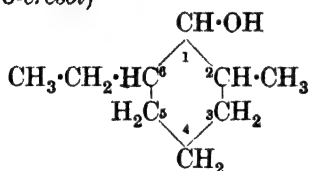
B.p. 89°/20 mm. D_4^{16} 0.9130. n_D^{16} 1.460.

Acetyl: b.p. 197°.

Phenylurethane: needles. M.p. 123°.

Sabatier, Mailhe, *Ann. chim. phys.*, 1907, **10**, 559.

2-Methyl-6-ethylcyclohexanol (3-Ethyl-hexahydro-o-cresol)



$C_9H_{18}O$

MW, 142

B.p. 202-4°. D_4^{20} 0.9268. n_D^{20} 1.4689.

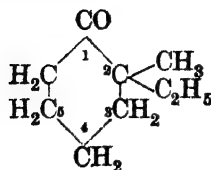
Haller, *Compt. rend.*, 1913, **157**, 183.

3-Methyl-6-ethylcyclohexanol (4-Ethyl-hexahydro-m-cresol).

B.p. 85-7°/11 mm.

Haller, *Compt. rend.*, 1905, **140**, 129.

2-Methyl-2-ethylcyclohexanone



$C_9H_{16}O$

MW, 140 $C_9H_{14}O$

2-Methyl-1-ethylcyclohexenone-3

B.p. 194-6°/760 mm. D_4^{17} 0.9037. n_D^{17} 1.4515.
Benzylidene: m.p. 78-78.5°. B.p. 193-4°/16 mm.

Haller, Cornubert, *Bull. soc. chim.*, 1927, **41**, 380.

5-Methyl-2-ethylcyclohexanone.

d.-

B.p. 83-4°/18 mm. D_4^{15} 0.9016. [α]_D + 8° 32'.

Semicarbazone: m.p. 152-4°.

dl.-

B.p. 197°. D^{20} 0.9000. n_D 1.4485.

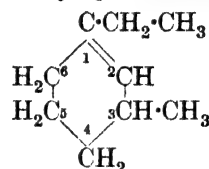
Oxime: cryst. from EtOH.Aq. M.p. 80°.

Semicarbazone: m.p. 178-81°.

Wallach, *Ann.*, 1913, **397**, 206.

Haller, *Compt. rend.*, 1905, **140**, 128.

3-Methyl-1-ethylcyclohexene



C_9H_{16}

MW, 124

d.-

B.p. 148-9°/743 mm. D_4^{19} 0.8154. n_D^{19} 1.4538.
[α]_D + 56.8°.

dl.-

B.p. 149-51°. D^0 0.8366, D^{20} 0.8296. n_D 1.454.

Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1084.

Zelinsky, Zelikow, *Ber.*, 1901, **34**, 3255.

4-Methyl-1-ethylcyclohexene.

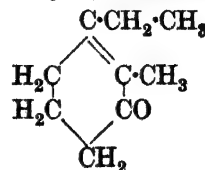
B.p. 149° (153-4°). D_4^0 0.8278, D_4^{18} 0.8169. n_D^{16} 1.453.

Nitroschloride: exists in two forms. (i) Prisms from Et₂O. M.p. 103-4°. (ii) Cryst. from Et₂O. M.p. 98-9°. (i) is more sol. Me₂CO and ligroin than (ii).

Sabatier, Mailhe, *Compt. rend.*, 1906, **142**, 439.

Wallach, *Ann.*, 1913, **396**, 282.

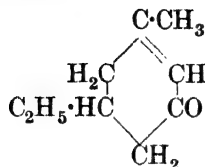
2-Methyl-1-ethylcyclohexenone-3



MW, 138

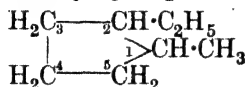
1-Methyl-5-ethylcyclohexenone-3

B.p. 105°/19 mm.

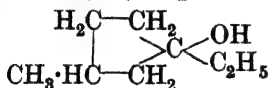
Semicarbazone: needles. M.p. 250°.Blaise, *Compt. rend.*, 1921, 173, 313.**1-Methyl-5-ethylcyclohexenone-3** $C_9H_{14}O$

MW, 138

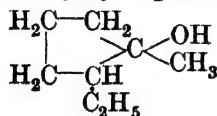
B.p. 223-7°/755 mm., 102°/14 mm.

Semicarbazone: plates from EtOH. M.p. 162-8° decomp.*Thiosemicarbazone*: m.p. 150-1°.Mazurewitsch, *J. Russ. Phys.-Chem. Soc.*, 1911, 43, 982.**1-Methyl-2-ethylcyclopentane** C_8H_{16}

MW, 112

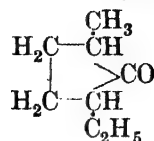
Cis:B.p. 128°. D_4^{20} 0.7846.*Trans*:B.p. 121-2°. D_4^{20} 0.7696.Chiurdoglu, *Chem. Abstracts*, 1932, 26, 4311.**1-Methyl-3-ethylcyclopentane.**B.p. 120-1°. D_4^{16} 0.7669. n_D^{16} 1.4215. $[\alpha]_D + 4.34^\circ$.Zelinsky, *Ber.*, 1902, 35, 2679.**3-Methyl-1-ethylcyclopentanol** $C_8H_{16}O$

MW, 128

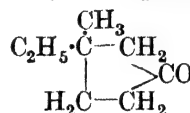
B.p. 71°/21 mm. D_4^{19} 0.8974.Zelinsky, *Ber.*, 1901, 34, 3952.**1-Methyl-2-ethylcyclopentanol** $C_8H_{16}O$

MW, 128

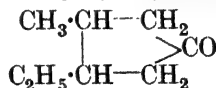
Exists in two forms.

(i) B.p. 64.5°/13 mm. D_4^{20} 0.8902.(ii) B.p. 67.5°/13 mm. D_4^{20} 0.9061.Chiurdoglu, *Chem. Abstracts*, 1932, 26, 4311.**691 8-Methyl-4-ethyl-1:2-dihydronaphthalene****2-Methyl-5-ethylcyclopentanone** $C_8H_{14}O$

MW, 126

B.p. 164-5°/750 mm. D_4^{12} 0.900. n_D^{13} 1.4400, n_D^{22} 1.4360.Cornubert, Borrel, *Bull. soc. chim.*, 1930, 47, 308.**3-Methyl-3-ethylcyclopentanone** $C_8H_{14}O$

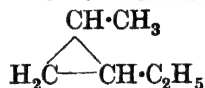
MW, 126

B.p. 174°. D_4^{18} 0.9072.*Semicarbazone*: cryst. from EtOH. M.p. 170°.*p*-Nitrobenzylidene: cryst. from C_6H_6 . M.p. 180°.v. Braun, Keller, Weissbach, *Ann.*, 1931, 490, 185.**3-Methyl-4-ethylcyclopentanone** $C_8H_{14}O$

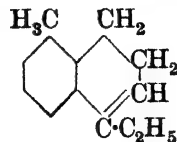
MW, 126

B.p. 180°. D_4^{18} 0.9059.*Oxime*: oil. B.p. 117-18°/11 mm.*Semicarbazone*: cryst. from EtOH.Aq. M.p. 208-9°.

See previous reference.

1-Methyl-2-ethylcyclopropane C_6H_{12}

MW, 84

B.p. 63.9-64.9°. D_4^{21} 0.6960. n_D^{21} 1.3876.Lespieau, Wakeman, *Bull. soc. chim.*, 1932, 51, 390.**8-Methyl-4-ethyl-1:2-dihydronaphthalene** $C_{13}H_{16}$

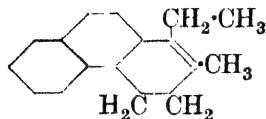
MW, 172

2-Methyl-1-ethyl-3 : 4-dihydrophenanthrene

B.p. 130-1°/12 mm.

Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 429.

2-Methyl-1-ethyl-3 : 4-dihydrophenanthrene



$C_{17}H_{18}$

MW, 222

Plates from EtOH. M.p. 77-8°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

Methyl ethyl Diketone.

See Acetylpropionyl.

α -Methyl- α -ethylidiphenylmethane.

See 2 : 2-Diphenyl-*n*-butane.

N-Methylethylenediamine



$C_3H_{10}N_2$

MW, 74

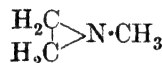
$B, 2HCl$: cryst. + H_2O from EtOH. M.p. 130-2° decomp.

B, H_2PtCl_6 : m.p. 240-2° decomp.

Picrate: m.p. 220-2°.

Johnson, Bailey, *J. Am. Chem. Soc.*, 1916, 38, 2141.

N-Methylethylenimine



C_3H_7N

MW, 57

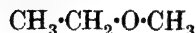
B.p. 27.5°/764 mm. $D_{20}^{19} 0.7572$. $n_D^{19} 1.3885$. Misc. with H_2O . Hot dil. $H_2SO_4 \rightarrow$ methyl-2-hydroxyethylamine. $C_6H_5COCl + NaOH \rightarrow$ *N*-methyl-*N*- β -chloroethylbenzamide.

$B, HAuCl_4$: yellow cryst. M.p. 95°. Sol. EtOH. Spar. sol. H_2O .

Picrate: yellow cryst. M.p. 120-122°. Spar. sol. EtOH, cold H_2O .

Marckwald, Frobenius, *Ber.*, 1901, 34, 3552.

Methyl ethyl Ether



C_3H_8O

MW, 60

B.p. 10.8°. $D_4^0 0.7252$. Heat of comb. C_p 505.87 Cal.

B, HBr : f.p. - 30°.

B, HI : cryst. M.p. 22°.

McIntosh, *J. Am. Chem. Soc.*, 1908, 30, 1104.

Dobriner, *Ann.*, 1888, 243, 2.

692

6-Methyl-3-ethylflavone

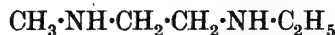
***sym.*-Methylethylethylene.**

See 2-Pentene.

***unsym.*-Methylethylethylene.**

See 2-Methylbutylene-1.

***sym.*-Methylethylethylenediamine**



$C_5H_{14}N_2$

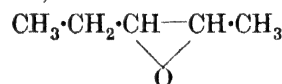
MW, 102

B.p. 133°. Misc. with H_2O . Decomp. in air. $B, 2HCl$: cryst. from EtOH. M.p. 217-18°.

B, H_2PtCl_6 : cryst. M.p. 240°. Sol. hot H_2O .

v. Braun, Heider, Müller, *Ber.*, 1918, 51, 739.

***sym.*-Methylethylethylene oxide** (2-Pentene oxide, 1-methyl- β -butylene oxide, 1-ethylpropylene oxide)



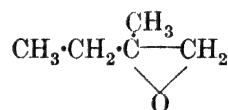
$C_5H_{10}O$

MW, 86

B.p. 80°. H_2O at 100° \rightarrow pentandiol-2 : 3.

Eltékoff, *J. Chem. Soc., Abstracts*, 1883, 44, 566.

***unsym.*-Methylethylethylene oxide** (2-Methyl- α -butylene oxide, 2-ethylpropylene oxide)



$C_5H_{10}O$

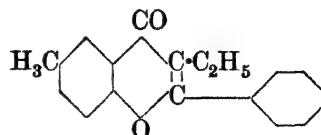
MW, 86

B.p. 82-3°. $D_4^0 0.843$. $NH(CH_3)_2$ in C_6H_6 at 125° \rightarrow 1-dimethylamino-2-methylbutanol-2. Kaolin at 400° \rightarrow 2-methylbutyraldehyde, isoprene, and trimethylethylene. Alumina at 250-60° \rightarrow 2-methylbutyraldehyde.

Fourneau, Tiffeneau, *Compt. rend.*, 1907, 145, 437.

Riedel, D.R.P., 199,148, (*Chem. Zentr.*, 1908, II, 121).

6-Methyl-3-ethylflavone



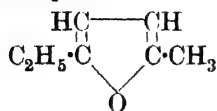
$C_{18}H_{16}O_2$

MW, 264

Needles from MeOH. M.p. 73-4°.

Wittig, Bangert, Richter, *Ann.*, 1925, 446, 188.

2-Methyl-5-ethylfuran

 $\text{C}_7\text{H}_{10}\text{O}$

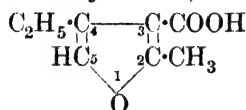
MW, 110

Oil. B.p. 118—19°. Misc. with most solvents. Insol. H_2O .

Fittig, Dietzel, *Ann.*, 1889, 250, 210.

Methylethylfurfurylamine.

See under *N*-Methylfurfurylamine.

2-Methyl-4-ethyl- β -furoic Acid (2-Methyl-4-ethylfuran-3-carboxylic acid). $\text{C}_8\text{H}_{10}\text{O}_3$

MW, 154

Cryst. from Et_2O -pet. ether. M.p. 105–6°. Sublimes in vacuo.

Reichstein, Hirt, *Helv. Chim. Acta*, 1933, 16, 10.

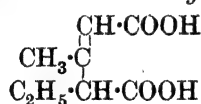
2-Methyl-5-ethyl- β -furoic Acid (2-Methyl-5-ethylfuran-3-carboxylic acid, methylvinic acid).

Cryst. from pet. ether. M.p. 98.5–99°.

Et ester: $\text{C}_{10}\text{H}_{14}\text{O}_3$. MW, 182. Oil. B.p. 98–104°/11 mm.

See previous reference.

2-Methyl-3-ethylglutaconic Acid (2-Methyl-1-pentene-1 : 3-dicarboxylic acid)

 $\text{C}_8\text{H}_{12}\text{O}_4$

MW, 172

Trans :

Needles from H_2O . M.p. 98°. Sol. Et_2O , C_6H_6 . Warm with $\text{HCl} \rightarrow$ *cis*-form. Ca and Ba salts are sol. H_2O .

Di-Et ester: $\text{C}_{12}\text{H}_{20}\text{O}_4$. MW, 228. B.p. 144°/15 mm., 136°/12 mm. D_4^{20} 1.005. n_D^{20} 1.454. $\text{HCl} \rightarrow$ *cis*-acid.

Et ester-nitrile: $\text{C}_{10}\text{H}_{15}\text{O}_2\text{N}$. MW, 181. B.p. 141°/20 mm.

Cis :

Plates from H_2O . M.p. 164° \rightarrow anhydride. Ca and Ba salts are insol. H_2O .

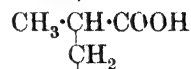
Di-Et ester: b.p. 143°/15 mm., 126°/10 mm. D_4^{20} 1.0076. n_D^{20} 1.4528.

Mononitrile: $\text{C}_8\text{H}_{11}\text{O}_2\text{N}$. MW, 153. Cryst. M.p. 175–6°. Sublimes. Spar. sol. H_2O , EtOH . Insol. Et_2O .

Anhydride: $\text{C}_8\text{H}_{10}\text{O}_3$. MW, 154. Plates from pet. ether. M.p. 53°.

Kon, Watson, *J. Chem. Soc.*, 1932, 10.

Bland, Thorpe, *J. Chem. Soc.*, 1912, 101, 1569.

1-Methyl-3-ethylglutaric Acid (*Hexane-2 : 4-dicarboxylic acid*) $\text{C}_8\text{H}_{14}\text{O}_4$

MW, 174

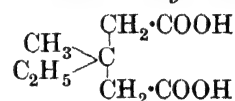
Exists in two forms.

(i) Paramethylethylglutaric acid. Needles from H_2O . M.p. 105°. Very sol. most solvents. Spar. sol. H_2O , ligroin. Insol. CS_2 , xylene. $k = 5.9 \times 10^{-5}$ at 25°.

(ii) Mesomethylethylglutaric acid. Needles from H_2O . M.p. 61°. $k = 5.7 \times 10^{-5}$ at 25°.

Bischoff, *Ber.*, 1891, 24, 1053.

2-Methyl-2-ethylglutaric Acid (2-Methyl-2-ethylpropane-1 : 3-dicarboxylic acid)

 $\text{C}_8\text{H}_{14}\text{O}_4$

MW, 174

Needles from H_2O . M.p. 87°. B.p. 260°/740 mm. k (first) $= 2.42 \times 10^{-4}$ at 25°; (second) $= 2.01 \times 10^{-7}$ at 25°.

Me ester: $\text{C}_9\text{H}_{16}\text{O}_4$. MW, 188. B.p. 128°/19 mm.

Anhydride: cryst. M.p. 25. B.p. 185°/20 mm.

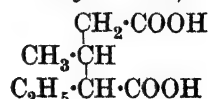
Monoanilide: $\text{C}_{14}\text{H}_{19}\text{O}_3\text{N}$. MW, 249. Cryst. from CHCl_3 -pet. ether. M.p. 105°.

1-Naphthalide: needles from EtOH . M.p. 126°.

Singh, Thorpe, *J. Chem. Soc.*, 1923, 123, 117.

Thole, Thorpe, *J. Chem. Soc.*, 1911, 99, 440.

2-Methyl-3-ethylglutaric Acid (2-Methyl-pentane-1 : 3-dicarboxylic Acid)

 $\text{C}_8\text{H}_{14}\text{O}_4$

MW, 174

Two forms are described in the literature.

(i) Prisms from H_2O . M.p. 100–1°. Sol. H_2O , Et_2O . $k = 6.7 \times 10^{-5}$ at 25°.

(ii) *Cis*: prisms from CHCl_3 -ligroin. M.p. 88°.

Imide: exists in two forms. (i) Needles from Et₂O-ligroin. M.p. 92°. (ii) Prisms from Et₂O-ligroin. M.p. 102°.

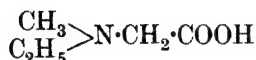
v. Pechmann, *Ber.*, 1900, **33**, 3340.

Michael, Ross, *J. Am. Chem. Soc.*, 1931, **53**, 1167.

1-Methyl-3-ethylglycerol.

See Hexantriol-2:3:4.

Methylethylglycine (*Methylethylaminoacetic acid*)



C₅H₁₁O₂N MW, 117

Free acid not isolated.

Cu salt: blue plates + 3H₂O from H₂O. Very sol. EtOH.

Me ester: C₆H₁₃O₂N. MW, 131. B.p. 151-2°. Sol. H₂O.

Et ester: C₇H₁₅O₂N. MW, 145. Oil. B.p. 164-5°. *B,HCl*: ppt. from Et₂O. M.p. 132°.

Willstätter, *Ber.*, 1902, **35**, 607.

Jones, Major, *J. Am. Chem. Soc.*, 1930, **52**, 1082.

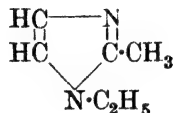
Methylethylglycollic Acid.

See 1-Hydroxy-1-methylbutyric Acid.

Methylethylglyoxal.

See Acetylpropionyl.

2-Methyl-1-ethylglyoxaline (*2-Methyl-1-ethyliminazole*)



C₆H₁₀N₂ MW, 110

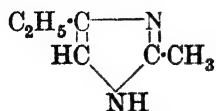
B.p. 212-13°. D₁₅ 0.982. Misc. with H₂O.

B,2HCl,ZnCl₂: prisms. M.p. 159-60°. Sol. H₂O.

Picrate: cryst. from EtOH. M.p. 171° (168-9°).

Sarasin, Wegmann, *Helv. Chim. Acta*, 1924, **7**, 722.

2-Methyl-4-ethylglyoxaline (*2-Methyl-4-ethyliminazole*)



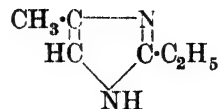
C₆H₁₀N₂ MW, 110

Oxalate: cryst. from Et₂O. M.p. 141°.

Picrate: yellow needles from H₂O. M.p. 90-1°.

See previous reference.

4-Methyl-2-ethylglyoxaline (*4-Methyl-2-ethyliminazole*)



C₆H₁₀N₂ MW, 110

Cryst. M.p. 45°. Very sol. H₂O, EtOH. Spar. sol. EtO. Hygroscopic.

B,HCl: plates. M.p. 132°. Hygroscopic.

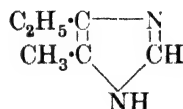
B,HNO₃: cryst. M.p. 129°.

Oxalate: plates from Me₂CO.Aq. M.p. 145°.

Picrate: yellow prisms from H₂O. M.p. 131°.

Windaus, Langenbeck, *Ber.*, 1922, **55**, 3707.

5-Methyl-4-ethylglyoxaline (*5-Methyl-4-ethyliminazole*)



C₆H₁₀N₂ MW, 110

Plates.

B,HAuCl₄: cryst. M.p. 167°. Spar. sol. most solvents.

Picrate: needles from 50% EtOH. M.p. 155-8°.

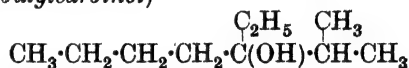
See previous reference and also

Jänecke, *Ber.*, 1899, **32**, 1097.

Methylethylglyoxime.

See under Acetylpropionyl.

2-Methyl-3-ethylheptanol-3 (*Ethylisopropylbutylcarbinol*)

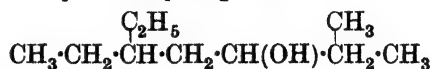


C₁₀H₂₂O MW, 158

B.p. 191-5°. D₂₀ 0.8455. *n_D* 1.4378.

Wallach, Gröppel, *Ann.*, 1915, **408**, 201.

2-Methyl-5-ethylheptanol-3



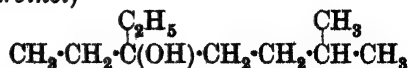
C₁₀H₂₂O MW, 158

B.p. 92°/28 mm.

Acetyl: b.p. 94-6°/23-5 mm.

Fourneau, Matti, *J. pharm. chim.*, 1931, **14**, 527.

2-Methyl-5-ethylheptanol-5 (*Diethylisopropylcarbinol*)



C₁₀H₂₂O MW, 158

2-Methyl-4-ethylheptanone-6

695

B.p. 83-6°/15 mm. D_4^{20} 0.852, D_4^{104} 0.844.
 n_D 1.44092.

Grignard, *Bull. soc. chim.*, 1904, **31**, 752.

2-Methyl-4-ethylheptanone-6

$C_{10}H_{18}O$ $\begin{array}{c} C_2H_5 \quad CH_3 \\ | \quad | \\ CH_3 \cdot CO \cdot CH_2 \cdot CH \cdot CH_2 \cdot CH \cdot CH_3 \end{array}$ MW, 154
Semicarbazone: cryst. from MeOH.Aq. M.p. 102°.

Fischer, Löwenberg, *Ber.*, 1933, **66**, 674.

2-Methyl-5-ethylheptanone-4.

See Isobutyl sec.-n-amyl Ketone.

4-Methyl-3-ethyl-2-heptenone-5.

See under Homomesitones.

4-Methyl-3-ethyl-3-heptenone-2.

See under Homomesitones.

4-Methyl-3-ethyl-3-heptenone-5.

See under Homomesitones.

4-Methyl-5-ethyl-3-heptenone-6.

See under Homomesitones.

2-Methyl-4-ethyl-2-heptenone-6

$C_{10}H_{16}O$ $\begin{array}{c} C_2H_5 \quad CH_3 \\ | \quad | \\ CH_3 \cdot CO \cdot CH_2 \cdot CH \cdot CH \cdot C \cdot CH_3 \end{array}$ MW, 152
 B.p. 74-5°/13 mm. D_4^{20} 0.8430. n_D^{20} 1.4546.
Semicarbazone: cryst. from MeOH. M.p. 127-8°.

Fischer, Löwenberg, *Ber.*, 1933, **66**, 674.

Methylethylhexanol-1.

See Methylethyl-n-hexyl Alcohol.

2-Methyl-4-ethylhexanol-4 (Diethylisobutylcarbinol)

$C_9H_{20}O$ $\begin{array}{c} C_2H_5 \quad CH_3 \\ | \quad | \\ CH_3 \cdot CH_2 \cdot C(OH) \cdot CH_2 \cdot CH \cdot CH_3 \end{array}$ MW, 144
 B.p. 172°. D_4^{22} 0.8396. n_D^{13} 1.43457.

Masson, *Compt. rend.*, 1901, **132**, 483.

2-Methyl-2-ethyl-n-hexyl Alcohol (2-Methyl-2-ethylhexanol-1)

$C_9H_{20}O$ $\begin{array}{c} CH_3 \\ | \\ CH_3 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot C \cdot CH_2OH \\ | \\ C_2H_5 \end{array}$ MW, 144
 B.p. 85.5-86°/11 mm. n_D^{20} 1.4401.

Whitmore, Badertscher, *J. Am. Chem. Soc.*, 1933, **55**, 1565.

3-Methyl-2-ethyl-n-hexyl Alcohol (3-Methyl-2-ethylhexanol-1)

$C_9H_{20}O$ $\begin{array}{c} H_3C \quad C_2H_5 \\ | \quad | \\ CH_3 \cdot CH_2 \cdot CH_2 \cdot CH \cdot CH \cdot CH_2OH \end{array}$ MW, 144

 β -Methyl- β -ethylhydrocinnamic Acid

B.p. 83-6°/10 mm. D_{25}^{25} 0.8383. n_D^{25} 1.4356.

Connor, Adkins, *J. Am. Chem. Soc.*, 1932, **54**, 4689.

5-Methyl-2-ethyl-n-hexyl Alcohol (5-Methyl-2-ethylhexanol-1)

$C_9H_{20}O$ $\begin{array}{c} CH_3 \quad C_2H_5 \\ | \quad | \\ CH_3 \cdot CH \cdot CH_2 \cdot CH_2 \cdot CH \cdot CH_2OH \end{array}$ MW, 144
 B.p. 84-6°/10 mm. D_{25}^{25} 0.8232. n_D^{25} 1.4304.
 See previous reference.

3-Methyl-1-ethylhydantoin

$C_6H_{10}O_2N_2$ $\begin{array}{c} C_2H_5 \cdot N^1 - CH_2 \\ | \\ OC_2 \\ | \\ CH_3 \cdot N^3 - CO \end{array}$ MW, 142
 Prisms. M.p. 93°. B.p. 278°. Very sol. H_2O and most org. solvents.
 Biltz, Slotta, *J. prakt. Chem.*, 1926, **113**, 261.

5-Methyl-5-ethylhydantoin.

Prisms from MeOH. M.p. 149° (146°). Sol. usual org. solvents.
 Biltz, Slotta, *J. prakt. Chem.*, 1926, **113**, 250.
 Bergs, D.R.P., 566,094, (*Chem. Abstracts*, 1933, **27**, 1001).
 Bucherre, Lieb, *J. prakt. Chem.*, 1934, **141**, 28.

1-Methyl-1-ethylhydracrylic Acid (2'-Hydroxy-1:1-dimethylbutyric acid)

$C_6H_{12}O_3$ $\begin{array}{c} CH_3 \\ | \\ HO \cdot CH_2 \cdot C \cdot COOH \\ | \\ CH_2 \cdot CH_3 \end{array}$ MW, 132
 Cryst. from Et_2O -pet. ether. M.p. 56°.
 Ox. \rightarrow methylethylacetaldehyde + methyl-ethylmalonic acid.
Et ester: $C_8H_{16}O_3$. MW, 160. B.p. 115°/36 mm., 108°/25 mm. *Acetyl*: b.p. 113°/20 mm.

Blaise, Marcilly, *Bull. soc. chim.*, 1903, **31**, 322.

 β -Methyl- β -ethylhydrocinnamic Acid (2-Methyl-2-phenylvaleric acid)

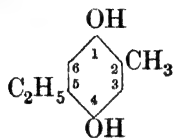
$C_{12}H_{16}O_2$ $\begin{array}{c} C_2H_5 \\ | \\ C_6H_5 \cdot C \cdot CH_2 \cdot COOH \\ | \\ CH_3 \end{array}$ MW, 192

B.p. 174°/14 mm.

Quinine salt: cryst. from EtOH.Aq. M.p. 86–8°.

Ingles, *J. Chem. Soc.*, 1911, **99**, 542.

2-Methyl-5-ethylhydroquinone (2 : 5-Di-hydroxy-p-ethyltoluene)



$C_9H_{12}O_2$

MW, 152

Plates. M.p. 165°.

Bayrac, *Ann. chim. phys.*, 1897, **10**, 73.

2-Methyl-6-ethylhydroquinone (2 : 5-Di-hydroxy-m-ethyltoluene).

Needles from C_6H_6 . M.p. 99–100°.

Jones, Kenner, *J. Chem. Soc.*, 1931, 1853.

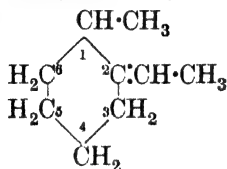
N-Methyl-O-ethylhydroxylamine.

See under N-Methylhydroxylamine.

3-Methyl-3-ethylidenecrotonic Acid.

See 3-Methylsorbic Acid.

1-Methyl-2-ethylidenecyclohexane



C_9H_{16}

MW, 124

B.p. 158°. D_0 0.823, D_{20} 0.81. n_D 1.47.

Murat, *Ann. chim. phys.*, 1909, **16**, 125.

1-Methyl-3-ethylidenecyclohexane.

l-.

B.p. 152°. D_{19}^{20} 0.8135. n_D 1.459. $[\alpha]_D -50^\circ$

Nitroschloride: prisms from Me_2CO . M.p. 114°.

dl-.

B.p. 153°. n_D 1.4584.

Wallach, Evans, *Ann.*, 1908, **360**, 51.

Haworth, Perkin, Wallach, *Ann.*, 1911, **379**, 144.

1-Methyl-4-ethylidenecyclohexane.

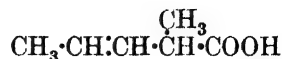
B.p. 152–3°. D_{21}^{21} 0.81. n_D^{21} 1.4571.

Nitroschloride: cryst. from $Et_2O-MeOH$ when two forms are obtained. Least sol., needles, m.p. 117–18°: more sol., plates, m.p. 113–14°. Both forms are volatile in steam.

Wallach, Rentschler, *Ann.*, 1909, **365**, 271.

Perkin, Wallach, *Ann.*, 1910, **374**, 202.

1-Methyl-2-ethylidenepropionic Acid (1-Methyl-2-butylene-1-carboxylic acid, 2-pentene-4-carboxylic acid, methylpropenylacetic acid, 2-ethylideneisobutyric acid)



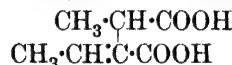
$C_6H_{10}O_2$

MW, 114

B.p. 198–9°/740 mm. D_{15}^{15} 0.966. n_D^{15} 1.4402. $k = 2.99 \times 10^{-5}$ at 25°. Heat of comb. C_p 797.9 Cal.

Fichter, Rudin, *Ber.*, 1904, **37**, 1616.

1-Methyl-2-ethylidenesuccinic Acid (1 : 3-Dimethylitaconic acid, 2-pentene-3 : 4-dicarboxylic acid, 1-methyl-1-butylene-2 : 3-dicarboxylic acid)



$C_7H_{10}O_4$

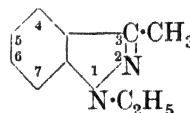
MW, 158

Cryst. from H_2O . M.p. 202° decomp. Mod. sol. $CHCl_3$, C_6H_6 , CS_2 , pet. ether. Spar. sol. hot H_2O , Et_2O .

Anhydride: oil. B.p. 131°/16 mm.

Fichter, Schlaepfer, *Ber.*, 1906, **39**, 1535.

3-Methyl-1-ethylindazole



$C_{10}H_{12}N_2$

MW, 160

Cryst. M.p. 29–30°. B.p. 245.5°. Misc. with EtOH, Et_2O . Mod. sol. H_2O . Volatile in steam.

Picrate: needles or plates from EtOH. M.p. 192–4°.

Auwers, *Ber.*, 1919, **52**, 1338.

5-Methyl-1-ethylindazole.

B.p. 125–6°/12 mm.

Picrate: greenish-yellow cryst. M.p. 146–7°.

Auwers, Lohr, *J. prakt. Chem.*, 1924, **108**, 297.

3-Methyl-2-ethylindazole.

Oil. B.p. 284–5°.

Picrate: prisms from EtOH. M.p. 212–13°.

Auwers, *Ber.*, 1919, **52**, 1338.

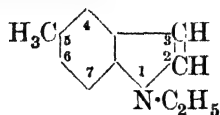
5-Methyl-2-ethylindazole.

B.p. 151°/15 mm.

Picrate: yellow cryst. M.p. 160–1°.

Auwers, Lohr, *J. prakt. Chem.*, 1924, **108**, 297.

5-Methyl-1-ethylindole

 $C_{11}H_{13}N$

MW, 159

B.p. 253–5°. Volatile in steam.

Hegel, *Ann.*, 1886, 232, 218.

3-Methyl-2-ethylindole (2-Ethylskatole).

Plates from pet. ether. M.p. 66°. B.p. 185°/35 mm. Sol. most org. solvent. Spar. sol. H_2O .

Picrate: red needles. M.p. 150–1°. Sol. C_6H_6 .

Plancher, *Gazz. chim. ital.*, 1898, 28, 388.

2-Methyl-3-ethylindole.

B.p. 291–3°/750 mm. (287–90°), 192–5°/50 mm., 156–8°/12 mm. Sol. EtOH, Et₂O. Spar. sol. H_2O .

Picrate: red cryst. M.p. 152–3° (148–50°). Spar. sol. cold C_6H_6 .

Fischer, *Ann.*, 1886, 236, 132.Fischer, Steche, *Ann.*, 1887, 242, 362.

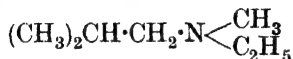
Ciamician, Plancher, *Ber.*, 1896, 29, 2476; *Gazz. chim. ital.*, 1898, 28, 347.

Oddo, Alberti, *Gazz. chim. ital.*, 1933, 63, 239.

Methylethylisoamylcarbinol.

See 2 : 5-Dimethylheptanol-5.

Methylethylisobutylamine

 $C_7H_{17}N$

MW, 115

B.p. 105°.

B, HI : cryst. from Me_2CO . M.p. 132°.B, $HAuCl_4$: m.p. 99°. Spar. sol. H_2O .

B_2, H_2PtCl_6 : m.p. 197° decomp. Mod. sol. H_2O . Spar. sol. EtOH.

Marckwald, v. Droste-Huelshoff, *Ber.*, 1899, 32, 562.

Methylethylisobutylcarbinol.

See 2 : 4-Dimethylhexanol-4.

Methylethylisobutylmethane.

See 2 : 4-Dimethyl-*n*-hexane.

Methylethylisopropylcarbinol (2 : 3-Dimethylpentanol-3)

 $C_7H_{16}O$

MW, 116

B.p. 139.4–139.9°/760 mm. (136°/760 mm., 122–4°), 138–40°/750 mm., 50°/18 mm., 44–5°/

14 mm., 42–3°/11 mm., 38–9°/7 mm. D_4^{20} 0.8487 (0.8586), D_4^{20} 0.8402 (0.833). n_D^{20} 1.4287 (1.4280, 1.427). Ox. \rightarrow acetone + methylethyl ketone + acetic acid.

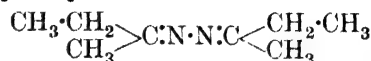
Kaschirski, *J. Russ. Phys.-Chem. Soc.*, 1881, 13, 89.

Harding, Walsh, Weizmann, *J. Chem. Soc.*, 1911, 99, 450.

Whitmore, Evers, *J. Am. Chem. Soc.*, 1933, 55, 813.

Pariselle, Simon, *Compt. rend.*, 1921, 173, 86.

Methylethylketazine

 $C_8H_{16}N_2$

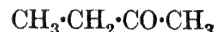
MW, 140

B.p. 171–2°/760 mm. (169–70°, 168–72°, 167–8°), 85.7°/37 mm., 75°/12 mm., 72°/10 mm. D_4^{20} 0.8404, D_4^{24} 0.8335, $D_4^{26.6}$ 0.8338. n_D^{20} 1.45160, $n_D^{26.6}$ 1.4511.

Curtius, Thun, *J. prakt. Chem.*, 1891, 44, 165.

Scholtz, *Ber.*, 1896, 29, 611.

Methyl ethyl Ketone (2-Ketobutane, butanone)

 C_4H_8O

MW, 72

F.p. – 86.35° (– 85.9°). B.p. 79.6°/760 mm., 81°/762.5 mm. D_4^{20} 0.82961, D_4^{15} 0.81005, D_4^{10} 0.8054. n_D^{15} 1.38140. $CrO_3 \rightarrow$ acetic acid. HNO_3 (D 1.38) \rightarrow diacetyl + dinitroethane + acetic acid + NH_3 . H (+ Ni) \rightarrow methylethylcarbinol. $HNO_2 \rightarrow$ isonitrosomethyl ethyl ketone. $PCl_5 \rightarrow$ 2 : 2-dichlorobutane. $NH_2 \cdot NH_2 \rightarrow$ methylethylketazine. Forms bisulphite comp.

Oxime : b.p. 152°. D_4^{20} 0.9232. Misc. with EtOH, Et₂O. Sol. 10 parts H_2O .

Di-Et acetal : b.p. 120°, 68°/100 mm.

Cyanhydrin : see under 1-Hydroxy-1-methylbutyric Acid.

Semicarbazone : m.p. 148° (139°).

2-Phenylsemicarbazone : plates. M.p. 168°.

4-p-Bromophenylsemicarbazone : m.p. 175°.

4-m-Nitrophenylsemicarbazone : pale yellow cryst. M.p. 205°.

p-Tolylsemicarbazone : m.p. 183–4°.

2 : 4-Diphenylthiosemicarbazone : needles from EtOH. M.p. 174°.

Phenylhydrazone : b.p. 190°/100 mm.

o-Nitrophenylhydrazone : orange-yellow cryst. M.p. 73°.

m-Nitrophenylhydrazone : yellow cryst. M.p. 99–5°.

p-Nitrophenylhydrazone : yellow needles. M.p. 128–9° (124°).

2:4-Dinitrophenylhydrazone : yellow cryst. M.p. 115°.

Methylphenylhydrazone : b.p. 176–7°/135 mm.

o-Chlorobenzoylhydrazone : plates. M.p. 81–2°.

p-Chlorobenzoylhydrazone : m.p. 161–2°.

m-Nitrobenzoylhydrazone : plates. M.p. 112°.

Frankland, Duppa, *Ann.*, 1866, **138**, 336.

Böcking, *Ann.*, 1880, **204**, 17.

Kannonnikow, Saizew, *Ann.*, 1875, **175**, 377.

Nef, *Ann.*, 1900, **310**, 323.

Schramm, *Ber.*, 1883, **16**, 1581.

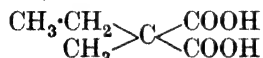
Senderens, *Bull. soc. chim.*, 1909, **5**, 484.

Meerwein, *Ann.*, 1913, **398**, 249.

1-Methyl-2-ethylmaleic Acid.

See dibasic-Hæmatinic Acid.

Methylethylmalonic Acid (Butane-2:2-dicarboxylic acid)



$\text{C}_6\text{H}_{10}\text{O}_4$

MW, 146

Prisms or needles from Et_2O . M.p. 122° (118°). Sol. H_2O , EtOH , Et_2O . Heat of comb. $C_v = 676.0$ Cal. k (first) = 1.67×10^{-3} (1.61×10^{-3}) at 25°: (second) = 0.17×10^{-6} . Heat at 180° \rightarrow 1-methylbutyric acid.

Di-Me ester : $\text{C}_8\text{H}_{14}\text{O}_4$. MW, 174. B.p. 189–91°, 90°/21 mm. D_4^{20} 1.0497. n_D^{20} 1.42175.

Di-Et ester : $\text{C}_{10}\text{H}_{18}\text{O}_4$. MW, 202. B.p. 207–8°, 102°/17 mm. D_{15}^{15} 0.994, $D_4^{18.2}$ 0.9970. $n_D^{19.2}$ 1.41896.

Me ester-amide : needles. M.p. 106–8°.

Diamide : $\text{C}_6\text{H}_{12}\text{O}_2\text{N}_2$. MW, 144. Cryst. from H_2O . M.p. 182–3°.

Nitrile : 1-methyl-1-cyanobutyric acid. $\text{C}_6\text{H}_9\text{O}_2\text{N}$. MW, 127. M.p. 39°. Et ester : $\text{C}_8\text{H}_{13}\text{O}_2\text{N}$. MW, 155. B.p. 198°. Amide : $\text{C}_6\text{H}_{10}\text{ON}_2$. MW, 126. Needles. M.p. 87°.

Conrad, Bischoff, *Ann.*, 1880, **204**, 147.

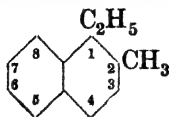
Neustädter, *Ann.*, 1907, **351**, 310.

Meyer, *Monatsh.*, 1906, **27**, 47.

Alexander Wacker Ges. für elektrochem.

Ind. G.m.b.H., D.R.P. 579,308, (*Chem. Abstracts*, 1933, **27**, 4545).

2-Methyl-1-ethylnaphthalene



$\text{C}_{13}\text{H}_{14}$

MW, 170

B.p. 135–45°/11 mm.

Picrate : golden-yellow needles from MeOH . M.p. 110–11°.

Styphnate : yellow needles from MeOH . M.p. 141°.

Brunner, Grof, *Monatsh.*, 1934, **64**, 79.

5-Methyl-1-ethylnaphthalene (1-Methyl-5-ethylnaphthalene).

Plates from EtOH . M.p. 40°. B.p. 133°/10 mm. n_D^{20} 1.600.

Picrate : orange needles. M.p. 97°.

Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 429.

6-Methyl-1-ethylnaphthalene (2-Methyl-5-ethylnaphthalene).

B.p. 135–8°/12 mm.

Picrate : golden-yellow needles. M.p. 81.5°.

Styphnate : yellow needles from MeOH . M.p. 90°.

Brunner, Grof, *Monatsh.*, 1934, **64**, 33.

7-Methyl-1-ethylnaphthalene (2-Methyl-8-ethylnaphthalene).

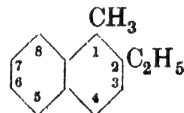
B.p. 128°/11 mm.

Picrate : golden-yellow needles. M.p. 106°.

Styphnate : yellow needles. M.p. 142–3°.

Brunner, Grof, *Monatsh.*, 1934, **64**, 34.

1-Methyl-2-ethylnaphthalene



$\text{C}_{13}\text{H}_{14}$

MW, 170

B.p. 140–5°/11 mm.

Picrate : orange needles from MeOH . M.p. 97°.

Styphnate : yellow needles from MeOH . M.p. 114°.

Brunner, Grof, *Monatsh.*, 1934, **64**, 78.

5-Methyl-2-ethylnaphthalene (1-Methyl-6-ethylnaphthalene).

B.p. 140°/12 mm. n_D^{20} 1.598.

Picrate : yellow needles from EtOH . M.p. 82°.

Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 431.

8-Methyl-2-ethylnaphthalene (1-Methyl-7-ethylnaphthalene).

B.p. 133°/12 mm. n_D^{20} 1.5970. Ox. \rightarrow naphthalene-1:7-dicarboxylic acid.

Picrate : m.p. 97° (95°).

Styphnate : m.p. 126°.

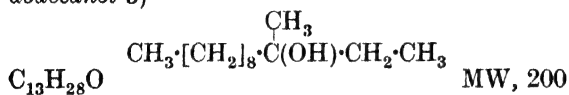
Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 428.

Nakamura, Ota, *Proceedings of the Imperial Academy, Tokyo*, 1934, **10**, 215.

Ruzicka, Eichenberger, *Helv. Chim. Acta*, 1930, **13**, 1123.

Ruzicka, van Melsen, *Helv. Chim. Acta*, 1931, **14**, 404.

Methylethynonylcarbinol (3-Methyldodecanol-3)



B.p. 131–40°/14 mm., 126–9°/10 mm.

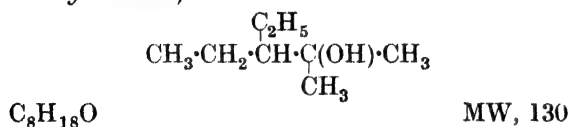
Locquin, Wousehg, *Compt. rend.*, 1922, **174**, 1428.

Thoms, Ambrus, *Arch. Pharm.*, 1925, **263**, 267.

2-Methyl-2-ethylpentanol-1.

See 2-Methyl-2-ethyl-*n*-amyl Alcohol.

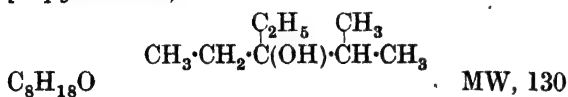
2-Methyl-3-ethylpentanol-2 (Dimethyl-sec.-*n*-amylcarbinol)



Liq. with aromatic odour. B.p. 156°. Misc. with EtOH, Et₂O, CHCl₃, C₆H₆, ligroin.

Clarke, *Am. Chem. J.*, 1908, **39**, 574.

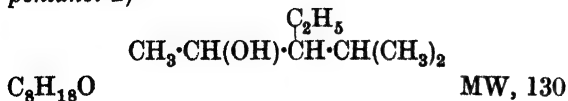
2-Methyl-3-ethylpentanol-3 (Diethylisopropylcarbinol)



B.p. 159.5–161°/750 mm. D₂₀²⁰ 0.8295.

Grigorovitch, Pavloff, *J. Chem. Soc., Abstracts*, 1893, **64**, 124.

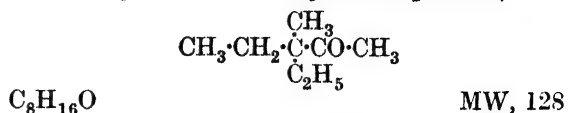
2-Methyl-3-ethylpentanol-4 (3-Isopropylpentanol-2)



B.p. 172°. Misc. with EtOH, Et₂O, CHCl₃, C₆H₆.

Clarke, *Am. Chem. J.*, 1908, **39**, 578.

3-Methyl-3-ethylpentanone-2 (1-Methyl-1 : 1-diethylacetone, 3-methyl-3-acetopentane)

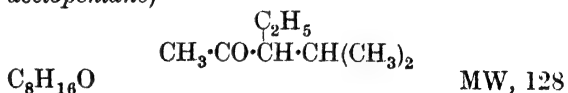


B.p. 153.5–154°. D₂₀²⁰ 0.8389.

Semicarbazone : m.p. 168°. Spar. sol. EtOH.

Nybergh, *Ber.*, 1922, **55**, 1963.

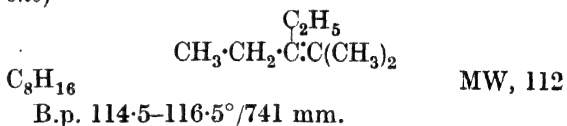
2-Methyl-3-ethylpentanone-4 (2-Methyl-3-acetopentane)



Liq. with camphor-like odour. B.p. 154°. Misc. with EtOH, Et₂O, CHCl₃, C₆H₆, AcOH.

Clarke, *Am. Chem. J.*, 1908, **39**, 577.

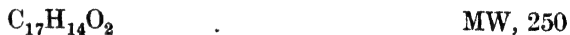
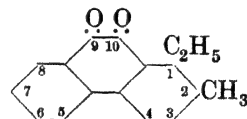
2-Methyl-4-ethylpentene-2 (3-Isopropylidene-pentane, 1 : 1-dimethyl-2 : 2-diethylethylene)



B.p. 114.5–116.5°/741 mm.

Grigorowitsch, Pawlow, *J. Russ. Phys.-Chem. Soc.*, 1891, **23**, 172.

2-Methyl-1-ethylphenanthraquinone



Red needles from AcOH. M.p. 157–9°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

7-Methyl-1-ethylphenanthraquinone.

Orange plates from EtOH. M.p. 154–5°.

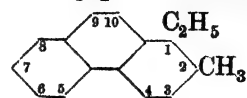
Haworth, *J. Chem. Soc.*, 1932, 2719.

1-Methyl-2-ethylphenanthraquinone.

Orange plates from EtOH. M.p. 163°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 461.

2-Methyl-1-ethylphenanthrene



MW, 220

7-Methyl-1-ethylphenanthrene

Plates from MeOH. M.p. 80°.

Picrate: yellow needles from MeOH. M.p. 134–5°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

7-Methyl-1-ethylphenanthrene.

See Homopimanthrene.

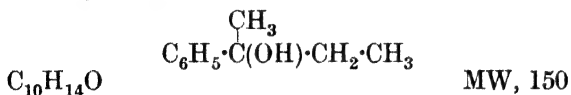
1-Methyl-2-ethylphenanthrene.

Plates from EtOH. M.p. 100°.

Picrate: yellow needles from MeOH. M.p. 134–5°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 461.

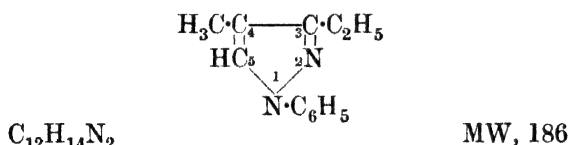
Methylethylphenylcarbinol (α -Hydroxy-sec.-n-butylbenzene, 2-phenyl-sec.-n-butyl alcohol, 2-phenylbutanol-2)



B.p. 211–12°, 103–4°/16 mm., 102°/14 mm.
D⁰ 0.9964, D₄²⁵ 0.9845. n_D^{25} 1.5158.

Klages, *Ber.*, 1902, **35**, 3507.

Tiffeneau, *Ann. chim.*, 1907, **10**, 362.

4-Methyl-3-ethyl-1-phenylpyrazole

B.p. 282–4° D¹⁵ 1.0476.

Claisen, Meyerowitz, *Ber.*, 1889, **22**, 3276.

Bouveault, *Bull. soc. chim.*, 1890, **4**, 649.

Mohr, *J. prakt. Chem.*, 1914, **90**, 520.

3-Methyl-4-ethyl-1-phenylpyrazole.

B.p. 294.5–295.5°.

$\text{B}_2\text{H}_2\text{PtCl}_6, 2\text{H}_2\text{O}$: yellowish-red cryst. M.p. 169°.

B.HAuCl_4 : yellow needles from alc. HCl. M.p. 141–2°.

Picrate: yellow cryst. from EtOH. M.p. 129.5–130°.

Stoermer, Martinsen, *Ann.*, 1907, **352**, 331.

5-Methyl-1-ethyl-3-phenylpyrazole.

B.p. 170°/14 mm. D₄²⁰ 1.048. n_D^{20} 1.582.

Picrate: m.p. 196–7°.

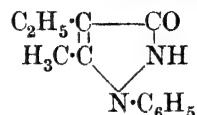
Auwers, Stuhlmann, *Ber.*, 1926, **59**, 1050.

700 3-Methyl-4-ethyl-1-phenylpyrazolone-5**3-Methyl-1-ethyl-5-phenylpyrazole.**

B.p. 145°/14 mm. D₄²⁰ 1.034. n_D^{20} 1.562.

Picrate: m.p. 116–17°.

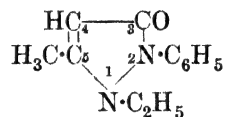
See previous reference.

5-Methyl-4-ethyl-1-phenylpyrazolone-3
(3-Methyl-4-ethyl-2-phenylpyrazolone-5)

$\text{C}_{12}\text{H}_{14}\text{ON}_2$ MW, 202

Needles from AcOH. M.p. 172°. Sol. EtOH, C_6H_6 , dil. acids and alkalis.

Michaelis, Drews, *Ann.*, 1906, **350**, 326.

5-Methyl-1-ethyl-2-phenylpyrazolone-3
(3-Methyl-2-ethyl-1-phenylpyrazolone-5, homoanti-pyrine)

$\text{C}_{12}\text{H}_{14}\text{ON}_2$ MW, 202

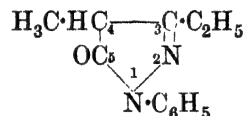
M.p. 72–3°. D₄²⁰⁻⁷ 1.0692. n_D^{20-7} 1.55566.

$\text{B}_2\text{H}_2\text{PtCl}_6, 2\text{H}_2\text{O}$: orange-red needles from H_2O . M.p. 180°.

Himmelbauer, *J. prakt. Chem.*, 1896, **54**, 191.

Knorr, *Ann.*, 1896, **293**, 3.

Mannich, Krösche, *Arch. Pharm.*, 1912, **250**, 653.

4-Methyl-3-ethyl-1-phenylpyrazolone-5

$\text{C}_{12}\text{H}_{14}\text{ON}_2$ MW, 202

M.p. 112.5° (111.5°). Sol. EtOH, CHCl_3 . Spar. sol. H_2O , Et_2O .

Schroeter, Kessler, Liesche, Müller, *Ber.*, 1916, **49**, 2719.

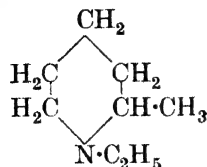
Emmerling, Kristeller, *Ber.*, 1906, **39**, 2453.

3-Methyl-4-ethyl-1-phenylpyrazolone-5.

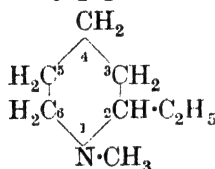
Needles from MeOH. M.p. 108°.

Mitra, *J. Ind. Chem. Soc.*, 1933, **10**, 493.

Knorr, Blank, *Ber.*, 1884, **17**, 2051.

2-Methyl-1-ethylpiperidine (*N*-Ethyl- α -pipecoline) $C_8H_{17}N$

MW, 127

d-.
B.p. 148°. $[\alpha]_D^{15} + 101.9^\circ$.*dl*-.
B.p. 148-9°/758 mm. (145-7°). $D^{18} 0.8361$.Goodyear, F.P., 751,286, (*Chem. Abstracts*, 1934, **28**, 1049).Leithe, *Ber.*, 1930, **63**, 805.Winans, Adkins, *J. Am. Chem. Soc.*, 1932, **54**, 310.Hohenemser, Wolffenstein, *Ber.*, 1899, **32**, 2522.**1-Methyl-2-ethylpiperidine** $C_8H_{17}N$

MW, 127

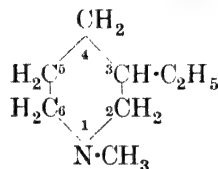
B.p. 150-151.5° (152°), 153.4-154.5°/730 mm. $D_0^0 0.8541$. Sol. 100 parts H_2O . Volatile in steam.*B, HCl*: hygroscopic needles from EtOH. M.p. 153-4°.*B, H, AuCl₄*: yellow needles. M.p. 118-19° (122-3°). Sol. EtOH. Spar. sol. H_2O .*Picrate*: yellow needles from H_2O . M.p. 175-6°.*B, HCl, 6HgCl₂*: cryst. M.p. 202-5°.Ladenburg, *Ber.*, 1898, **31**, 291; *Ann.*, 1888, **247**, 71.Lipp, *Ber.*, 1900, **33**, 3516.Heidrich, *Ber.*, 1901, **34**, 1891.**6-Methyl-2-ethylpiperidine** (2-Methyl-6-ethylpiperidine, 6-ethyl- α -pipecoline)

Exists in two forms.

(I).

d-.
 $[\alpha]_D^{17.5} + 14^\circ$.*B, H, AuCl₄*: plates. M.p. 133.5-134.5°.*B₂, H₂, PtCl₆*: prisms. M.p. 204-6° decomp.*l*-.
 $[\alpha]_D^{17} - 14.1^\circ$.*B, HCl*: needles. M.p. 287-8°.*dl*-.
B.p. 151-151.5°/755 mm. $D^{14.5} 0.8306$.*B, HCl*: needles. M.p. 253.5-254°.*B, H, AuCl₄*: yellow cryst. M.p. about 134°.*B₂, H₂, PtCl₆*: prisms. M.p. 188-90°. Sol. H_2O .*Picrate*: needles. M.p. about 135°.

(II). Iso-6-methyl-2-ethylpiperidine.

B.p. 157-157.7°/756 mm. $D^{14.5} 0.8450$.*B, HCl*: needles. M.p. 171.5-172.5°.*B₂, H₂, PtCl₆*: needles. M.p. 196-7°.*Picrate*: plates. M.p. 101.5-102°.Löffler, Thiel, *Ber.*, 1909, **42**, 138.**1-Methyl-3-ethylpiperidine** $C_8H_{17}N$

MW, 127

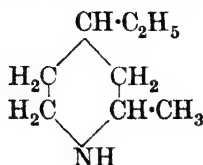
B.p. 153.1°/756 mm., 148-51°/726 mm. $D^0 0.8394$. Prac. insol. H_2O .*B, HCl*: needles or prisms from H_2O . M.p. 170-2° (174-6°). Sol. H_2O , EtOH.*B, H, AuCl₄*: needles from H_2O . M.p. 101-1° (104-5°).*B₂, 2HCl, 3HgCl₂*: needles from H_2O . M.p. 91-2°. Sol. hot H_2O , EtOH.*B₂, H₂, PtCl₆*: orange-red prisms from EtOH. M.p. 145-8°. Sol. H_2O .*Picrate*: needles from Et₂O. M.p. 133-4°. Sol. hot H_2O , EtOH.Ladenburg, *Ber.*, 1898, **31**, 289; *Ann.*, 1898, **301**, 147.Lipp, Widmann, *Ber.*, 1905, **38**, 2276; *Ann.*, 1915, **409**, 79.**4-Methyl-3-ethylpiperidine** (3-Ethyl- γ -pipecoline, hexahydro- β -collidine).B.p. 175-80°, 63-5°/12 mm. Sol. Et₂O.*B, H, AuCl₄*: yellow needles from EtOH-Et₂O. M.p. 126-8°.*B₂, H₂, PtCl₆*: orange-red needles from dil. HCl or plates from EtOH. M.p. 207° decomp.*Oxalate*: cryst. from EtOH-Et₂O. M.p. 185-7°.de Montmollin, Martenet, *Helv. Chim. Acta*, 1929, **12**, 608.de Montmollin, Swiss P., 127,779, (*Chem. Abstracts*, 1929, **23**, 2190).Koenigs, Bernhart, *Ber.*, 1905, **38**, 3048.Gechsner de Coninck, *Bull. soc. chim.*, 1884, **42**, 122.

6-Methyl-3-ethylpiperidine

6-Methyl-3-ethylpiperidine.

See Copellidine and Isocopellidine.

2-Methyl-4-ethylpiperidine (4-Ethyl- α -pipercoline, hexahydro- α -collidine)



$C_8H_{17}N$ MW, 127

B.p. 155–60°. D_4^{20} 0.8515, D_4^{20} 0.8389.

B, HCl : needles. M.p. 213°. Sol. H_2O , EtOH.

Ladenburg, Schultz, *Ann.*, 1888, **247**, 96.

2-Methyl-2-ethylpropane-1 : 3-dicarboxylic Acid.

See 2-Methyl-2-ethylglutaric Acid.

Methylethylpropenylcarbinol.

See 4-Methyl-2-hexenol-4.

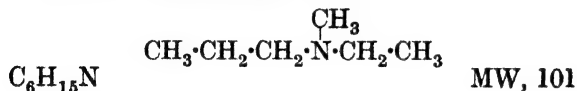
2-Methyl-2-ethylpropionic Acid.

See 2-Methylvaleric Acid.

Methylethylpropylacetic Acid.

See 3-Methylhexane-3-carboxylic Acid.

Methylethylpropylamine



B.p. 91–2°.

B, HCl : needles from Me_2CO . M.p. 177–9°.

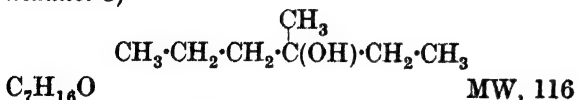
B_2, H_2PtCl_6 : orange needles. M.p. 176–7°.

Picrate: yellow leaflets from EtOH. M.p. 94–5°.

Emmert, *Ber.*, 1909, **42**, 1510.

Meisenheimer, Bernhard, *Ann.*, 1922, **428**, 258.

Methylethylpropylcarbinol (3-Methylhexanol-3)



B.p. 140.3°/745 mm. (139–41°), 56°/16–20 mm. D_4^{20} 0.82338, D_4^{20} 0.81519. n_D^{20} 1.4231. $CrO_3 \rightarrow$ acetic + propionic acids.

Acetyl: b.p. 158–9°.

Allophanate: m.p. 148°.

Pawlow, *Ann.*, 1877, **188**, 122.

Sokolow, *J. prakt. Chem.*, 1889, **39**, 431.

Halse, *J. prakt. Chem.*, 1914, **89**, 452.

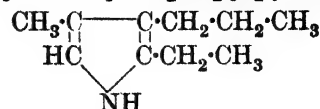
Whitmore, Badertscher, *J. Am. Chem. Soc.*, 1933, **55**, 4160.

702 3-Methyl-1-ethylpyrazole-5-carboxylic Acid

Methylethylpropylmethane.

See 3-Methylhexane.

4-Methyl-2-ethyl-3-propylpyrrole



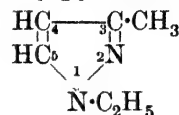
$C_{10}H_{17}N$ MW, 151

B.p. 82°/12 mm. Resinifies in air.

Picrate: m.p. 168°.

Fischer, Klarer, *Ann.*, 1926, **447**, 58.

3-Methyl-1-ethylpyrazole



$C_6H_{10}N_2$ MW, 110

B.p. 152°. D_4^{20} 0.936. n_D^{20} 1.4675.

Picrate: yellow needles from MeOH. M.p. 114–15°.

Auwers, Broche, *Ber.*, 1922, **55**, 3900.

Auwers, Hollmann, *Ber.*, 1926, **59**, 605, 1297.

5-Methyl-1-ethylpyrazole.

$C_6H_{10}N_2$ MW, 110

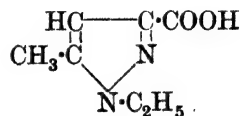
B.p. 161°. D_4^{20} 0.951. n_D^{20} 1.4741.

Picrate: m.p. 143° (139–41°).

See second reference above and also

Auwers, Cauer, *Ber.*, 1928, **61**, 2409.

5-Methyl-1-ethylpyrazole-3-carboxylic Acid



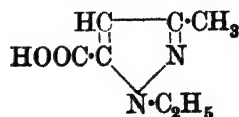
$C_7H_{10}O_2N_2$ MW, 154

Cryst. from H_2O or C_6H_6 . M.p. 136–7°. Sol. EtOH. Spar. sol. H_2O , Et_2O , C_6H_6 .

Ester: $C_9H_{14}O_2N_2$. MW, 182. B.p. about 285°, 154°/12 mm. D_4^{20} 1.079. n_D^{20} 1.4922. Sol. conc. HCl, reppd. on dilution.

Auwers, Hollmann, *Ber.*, 1926, **59**, 603.

3-Methyl-1-ethylpyrazole-5-carboxylic Acid



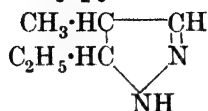
$C_7H_{10}O_2N_2$ MW, 154

Cryst. from H_2O or C_6H_6 . M.p. 141–2°. Sol. EtOH. Spar. sol. H_2O , Et_2O , C_6H_6 .

Et ester: $C_9H_{14}O_2N_2$. MW, 182. B.p. about 235° , $101.5\text{--}102.0^\circ/12$ mm. D_4^{20} 1.040. n_D^{20} 1.4768. *Picrate*: cryst. from MeOH.Aq. M.p. $68\text{--}9^\circ$. Decomp. on cryst. from C_6H_6 or ligroin.

See previous reference.

4-Methyl-5-ethylpyrazoline



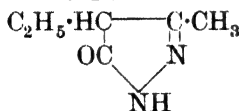
$C_8H_{12}N_2$ MW, 112

Liq. with peppermint-like odour. B.p. 180° , $105\text{--}7^\circ/18$ mm., $65\text{--}7^\circ/10$ mm. Misc. with EtOH, Et_2O , $CHCl_3$. Fehling's \rightarrow blue ppt. *N*-Benzenesulphonyl: m.p. 118° .

Locquin, Heilmann, *Compt. rend.*, 1925, 180, 1759.

Curtius, Rechnitz, *J. prakt. Chem.*, 1916, 94, 317.

3-Methyl-4-ethylpyrazolone-5



$C_8H_{10}ON_2$ MW, 126

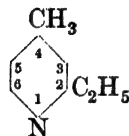
Plates from hot H_2O or dil. EtOH. M.p. 229° (226° , 190°). Sol. EtOH. Spar. sol. Et_2O . Prac. insol. C_6H_6 .

Locquin, *Compt. rend.*, 1902, 135, 110.

Wolff, Thielepape, *Ann.*, 1920, 420, 280.

De, Dutt, *J. Indian Chem. Soc.*, 1930, 7, 473.

Backer, Meyer, *Rec. trav. chim.*, 1926, 45, 86.

4-Methyl-2-ethylpyridine (2-Ethyl- γ -picoline)

$C_8H_{11}N$ MW, 121

B.p. $172\text{--}3^\circ$.

Picrate: yellow prisms from EtOH. M.p. $122\text{--}3^\circ$.

$B.HAuCl_4$: m.p. 80° .

$B_2H_2PtCl_6$: m.p. 176° decomp.

Bardhan, *J. Chem. Soc.*, 1929, 2230.

Tschitschibabin, *J. Russ. Phys.-Chem. Soc.*, 1924, 54, 607.

Eckert, Loria, *Monatsh.*, 1917, 38, 233.

6-Methyl-2-ethylpyridine (5-Ethyl- α -picoline)

B.p. $160\text{--}161.5^\circ/760$ mm. D^{15} 0.9229. Spar. sol. H_2O . Volatile in steam. $KMnO_4 \rightarrow$ pyridine-2:6-dicarboxylic acid. $Na + EtOH \rightarrow$ 6-methyl-2-ethylpiperidine.

$B.HAuCl_4$: yellow needles. M.p. $127.5\text{--}128.5^\circ$.

$B_2H_2PtCl_6$: cryst. M.p. $188\text{--}90^\circ$ decomp.

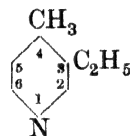
Picrate: yellow plates from EtOH. M.p. $127\text{--}127.5^\circ$.

Schultz, *Ber.*, 1887, 20, 2722.

Ladenburg, *Ann.*, 1888, 247, 46.

Löffler, Thiel, *Ber.*, 1909, 42, 137.

Eckert, Loria, *Monatsh.*, 1917, 38, 228.

4-Methyl-3-ethylpyridine (β -Collidine, 3-ethyl- γ -picoline)

$C_8H_{11}N$ MW, 121

B.p. $195\text{--}6^\circ/753$ mm. (179°), $76^\circ/12$ mm. D^0 0.9656. Sol. EtOH, Et_2O . Spar. sol. H_2O . Volatile in steam. Cold $KMnO_4 \rightarrow$ 4-methylpyridine-3-carboxylic acid + pyridine-3:4-dicarboxylic acid. Hot $KMnO_4 \rightarrow$ nicotinic acid. $Na + EtOH \rightarrow$ 4-methyl-3-ethylpiperidine.

$B.HCl$: hygroscopic plates.

$B.HAuCl_4$: m.p. $140\text{--}1^\circ$.

$B_2H_2PtCl_6$: orange-red cryst. M.p. $234\text{--}5^\circ$ decomp.

$B_2.2HCl.HgCl_2$: needles. M.p. 106° . Sol. EtOH. Spar. sol. H_2O .

Picrate: cryst. from dil. EtOH. M.p. $148\text{--}50^\circ$.

Oechsner de Coninck, *Ann. chim.*, 1882, 27, 469.

Koenigs, *Ber.*, 1894, 27, 1503.

Rabe, Jantzen, *Ber.*, 1921, 54, 928.

Ruzicka, Fornasir, *Helv. Chim. Acta*, 1919, 2, 338.

Koenigs, Hoffmann, *Ber.*, 1925, 58, 194.

6-Methyl-3-ethylpyridine (2-Methyl-5-ethylpyridine, 5-ethyl- α -picoline, aldehyde-collidine)

B.p. $174\text{--}6^\circ$. D^0 0.9369, D^{25} 0.9184. Volatile in steam. Sol. EtOH, Et_2O , C_6H_6 . Prac. insol. H_2O . Sol. dil. acids. $KMnO_4 \rightarrow$ 6-methylpyridine-3-carboxylic acid + pyridine-2:5-dicarboxylic acid.

$B.HCl$: hygroscopic needles.

$B.HAuCl_4$: yellow needles or plates. M.p. 87° . Sol. hot H_2O .

2-Methyl-4-ethylpyridine

B_2, H_2PtCl_6 : orange-red prisms or needles from dil. EtOH. M.p. 180–1°.

$B_2, 2HCl, 5HgCl_2$: needles. M.p. 64°.

$B, HCl, 6HgCl_2$: plates from H_2O . M.p. 168°.

Picrate: yellow plates or needles from H_2O or dil EtOH. M.p. 164–5°.

Krämer, *Ber.*, 1870, **3**, 262.

Ador, Baeyer, *Ann.*, 1870, **155**, 297.

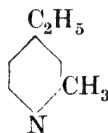
Dürkopf, *Ber.*, 1885, **18**, 920.

Plath, *Ber.*, 1888, **21**, 3086.

Fichter, Labhardt, *Ber.*, 1909, **42**, 4714.

M.L.B., E.P., 147, 101, (*Chem. Abstracts*, 1920, **14**, 3676).

2-Methyl-4-ethylpyridine (α -Collidine, 4-ethyl- α -picoline)



$C_8H_{11}N$ MW, 121

B.p. 179–80° (177–9°/751 mm.). Sol. EtOH, Et_2O , C_6H_6 . D_4^{20} 0.9291. $KMnO_4 \rightarrow$ lutidinic acid. $Na + EtOH \rightarrow$ 2-methyl-4-ethyl-piperidine.

$B, HAuCl_4$: yellow needles from H_2O . M.p. 90°. Sol. EtOH, Et_2O .

B_2, H_2PtCl_6 : yellow cubes. M.p. 203°. Sol. H_2O .

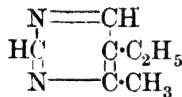
Picrate: yellow plates from EtOH. M.p. 141–2°. Sol. EtOH. Spar. sol. H_2O .

Schultz, *Ber.*, 1887, **20**, 2725.

Ladenburg, *Ann.*, 1888, **247**, 47.

Eckert, Loria, *Monatsh.*, 1917, **38**, 228.

4-Methyl-5-ethylpyrimidine



$C_7H_{10}N_2$ MW, 122

B.p. 193.5°/758 mm. Misc. with H_2O .

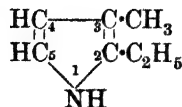
$B, 2HgCl_2$: needles. M.p. 155°.

$B, PtCl_4$: needles. M.p. 210–15°.

$B, AuCl_3$: needles. M.p. 104–6°. Sol. hot H_2O .

Byk, *Ber.*, 1903, **36**, 1917.

3-Methyl-2-ethylpyrrole (4-Methyl-5-ethylpyrrole)



$C_7H_{11}N$ MW, 109

704 3-Methyl-4-ethylpyrrole-2-carboxylic Acid

Liq.

Picrate: cryst. from EtOH. M.p. 137°.

Fischer, Wiedemann, *Z. physiol. Chem.*, 1926, **155**, 64.

4-Methyl-2-ethylpyrrole (3-Methyl-5-ethylpyrrole).

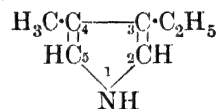
B.p. 93°/40 mm.

Picrate: m.p. 86°.

Fischer, Klarer, *Ann.*, 1926, **447**, 59.

Fischer, Kürzinger, *Z. physiol. Chem.*, 1931, **196**, 231.

4-Methyl-3-ethylpyrrole (Opsopyrrole, 3-methyl-4-ethylpyrrole)



$C_7H_{11}N$ MW, 109

Yellow oil. B.p. 70°/11 mm. D_4^{20} 0.9059. n_D^{20} 1.49126.

Fischer, Sturm, Friedrich, *Ann.*, 1928, **461**, 259.

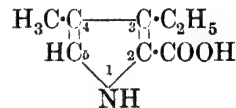
Fischer, Halbig, *Ann.*, 1926, **450**, 159.

5-Methyl-3-ethylpyrrole (2-Methyl-4-ethylpyrrole).

B.p. 86°/20 mm.

Fischer, Klarer, *Ann.*, 1926, **450**, 199.

4-Methyl-3-ethylpyrrole-2-carboxylic Acid



$C_8H_{11}O_2N$ MW, 153

Et ester: $C_{10}H_{15}O_2N$. MW, 181. Cryst. from EtOH.Aq. M.p. 75°. B.p. 174–8°/11 mm.

Fischer, Siedel, Le Thierry d'Ennequin, *Ann.*, 1933, **500**, 190.

5-Methyl-3-ethylpyrrole-2-carboxylic Acid.

Et ester: cryst. from EtOH.Aq. M.p. 86°.

Fischer, Klarer, *Ann.*, 1926, **450**, 200.

3-Methyl-4-ethylpyrrole-2-carboxylic Acid.

Et ester: cryst. M.p. 25°. B.p. 135–45°/11 mm.

Fischer, Siedel, Le Thierry d'Ennequin, *Ann.*, 1933, **500**, 190.

3-Methyl-5-ethylpyrrole-2-carboxylic Acid 705

3-Methyl-5-ethylpyrrole-2-carboxylic Acid.

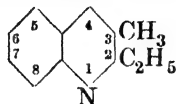
Et ester: cryst. from EtOH. M.p. 74°.

Fischer, Klarer, *Ann.*, 1925, **442**, 3.

2-Methylethylquinoline.

See Ethylquinoline.

3-Methyl-2-ethylquinoline



$C_{12}H_{13}N$

MW, 171

Prisms from Et₂O or pet. ether. M.p. 57°. B.p. 268-9°/711 mm. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. CrO₃ → 3-methylquinoline-2-carboxylic acid. Sn + HCl → 3-methyl-2-ethyl-1:2:3:4-tetrahydroquinoline.

B₂H₂PtCl₆.2H₂O: plates or needles. M.p. 238° decomp., anhyd. 249° decomp.

Picrate: yellow cryst. from H₂O or EtOH. M.p. 195° (193°).

Methiodide: yellow needles from EtOH. M.p. 196° part decomp.

Doebner, v. Miller, *Ber.*, 1884, **17**, 1714.

Eliasberg, Friedländer, *Ber.*, 1892, **25**, 1755.

Niementowski, Orzechowski, *Ber.*, 1895, **28**, 2815.

Murakami, *Chem. Abstracts*, 1930, **24**, 2462.

6-Methyl-2-ethylquinoline.

Needles from Et₂O or pet. ether. M.p. 59-60°. B.p. 270°/718 mm.

Picrate: yellow cryst. M.p. 244-5°. Prac. insol. H₂O.

Harz, *Ber.*, 1885, **18**, 3395.

4-Methyl-3-ethylquinoline (3-Ethyl-lepidine).

Sol. Et₂O with blue fluor. Volatile in steam.

B₂H₂PtCl₆: yellow plates. M.p. 200° decomp.

Picrate: yellow needles from EtOH. M.p. 202°.

Byvanck, *Ber.*, 1898, **31**, 2150.

8-Methyl-6-ethylquinoline.

B.p. 273-5°.

Mailhe, *Bull. soc. chim.*, 1921, **29**, 717.

Methyl ethyl selenide



C_3H_8Se

MW, 123

Dict. of Org. Comp.—II.

1-Methyl-2-ethylsuccinic Acid

B.p. 86°. D₄²⁵ 1.3134. n_D²⁵ 1.4820.

Tschugajew, *Ber.*, 1909, **42**, 53.

β-Methyl-β-ethylstyrene (2-Benzylidene-butane, 2-methyl-1-phenylbutylene-1)



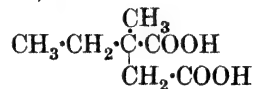
$C_{11}H_{14}$

MW, 146

B.p. 201-2°. n_D¹⁸ 1.528.

Levy, Tabart, *Bull. soc. chim.*, 1931, **49**, 1781.

1-Methyl-1-ethylsuccinic Acid (2-Methyl-butane-1:2-dicarboxylic acid, isopentane-1:2-dicarboxylic acid)



$C_7H_{12}O_4$

MW, 160

Prisms from H₂O. M.p. 104°. B.p. 154-6°/12 mm. 100 parts H₂O dissolve 15.4 parts at 15°. Sol. EtOH, Et₂O, hot C₆H₆. Spar. sol. logroin. $k = 9.5 \times 10^{-5}$ at 25°. Heat at 135° → anhydride.

Anhydride: C₇H₁₀O₃. MW, 142. B.p. 239-45°/765 mm. Spar. sol. H₂O.

Di-Et ester: C₁₁H₂₀O₄. MW, 216. B.p. 120-2°/14 mm.

Auwers, Fritzweiler, *Ann.*, 1897, **298**, 166.

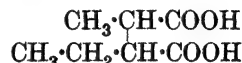
Hell, *Ber.*, 1891, **24**, 1390.

Higson, Thorpe, *J. Chem. Soc.*, 1906, **89**, 1468.

Inglis, *J. Chem. Soc.*, 1911, **99**, 544.

v. Braun, Keller, Weissbach, *Ann.*, 1931, **490**, 185.

1-Methyl-2-ethylsuccinic Acid (Pentane-2:3-dicarboxylic acid)



$C_7H_{12}O_4$

MW, 160

Exists in two forms.

(i) Needles from H₂O. M.p. 177-82°. 100 parts H₂O dissolve 3 parts at 17°. Sol. EtOH, Et₂O. Spar. sol. CHCl₃. Prac. insol. C₆H₆, logroin. $k = 2.10 \times 10^{-4}$ (2.13 × 10⁻⁴) at 25°.

Anhydride: C₇H₁₀O₃. MW, 142. B.p. 245°.

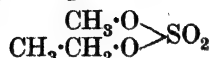
(ii) Needles from H₂O. M.p. 101-2°. 100 parts H₂O dissolve 16.1 parts at 13°. Sol. most org. solvents. $k = 2.12 \times 10^{-4}$ (2.01 × 10⁻⁴, 1.98 × 10⁻⁴) at 25°.

Methyl ethyl sulphate

Anhydride: b.p. 245°.

Michael, *Ber.*, 1896, **29**, 1791.
Küster, Haas, *Ann.*, 1906, **345**, 57.
Bischoff, Mintz, *Ber.*, 1890, **23**, 647.
Fichter, *Ann.*, 1908, **361**, 387.
Auwers, Fritzweiler, *Ann.*, 1897, **298**, 162.
v. Braun, Keller, Weissbach, *Ann.*, 1931, **490**, 183.

Methyl ethyl sulphate



$\text{C}_3\text{H}_8\text{O}_4\text{S}$ MW, 140
B.p. 198–200°/742 mm. Used as alkylating agent.

Thayer, *J. Am. Chem. Soc.*, 1924, **46**, 1045.

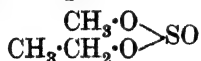
Methyl ethyl sulphide



$\text{C}_3\text{H}_8\text{S}$ MW, 76
F.p. –104.8°. B.p. 66.9°/760 mm. (65–6°).
 D_4^{21} 0.8369. KMnO_4 or $\text{HNO}_3 \rightarrow$ methyl ethyl sulphoxide + methyl ethyl sulphone. HgI_2 in $\text{Me}_2\text{CO} \rightarrow \text{C}_3\text{H}_8\text{S}, \text{HgI}_2$, m.p. 59°.

Klason, *Ber.*, 1887, **20**, 3413.
Carrara, *Atti accad. Lincei*, 1892, **i**, 308.

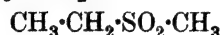
Methyl ethyl sulphite



$\text{C}_3\text{H}_8\text{O}_3\text{S}$ MW, 124
B.p. 141–2°, 53°/20 mm. D_4^{18} 1.1364. n_D^{11} 1.4167. Alkylating agent.

Voss, Blanke, *Ann.*, 1931, **485**, 274.

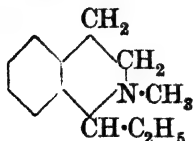
Methyl ethyl sulphone



$\text{C}_3\text{H}_8\text{O}_2\text{S}$ MW, 108
Needles from Et_2O . M.p. 36°. Sol. H_2O , EtOH . Spar. sol. Et_2O .

Beckmann, *J. prakt. Chem.*, 1878, **17**, 455.

2-Methyl-1-ethyl-1 : 2 : 3 : 4-tetrahydro-isoquinoline



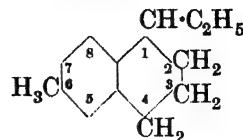
$\text{C}_{12}\text{H}_{17}\text{N}$ MW, 175
Oil. B.p. 135°/30 mm.
Methiodide: cryst. from $\text{EtOH} \cdot \text{Aq}$. M.p. 159–60° decomp.

Freund, Bode, *Ber.*, 1909, **42**, 1760.

706

1-Methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydroquinoline

6-Methyl-1-ethyl-1 : 2 : 3 : 4-tetrahydronaphthalene (6-Methyl-1-ethyltetralin)



$\text{C}_{13}\text{H}_{18}$ MW, 174
B.p. 126°/10 mm.

Brunner, Grof, *Monatsh.*, 1934, **64**, 33.

5-Methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydronaphthalene (5-Methyl-2-ethyltetralin).

B.p. 130°/16 mm.

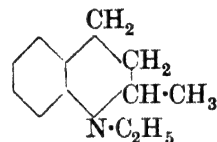
Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 431.

8-Methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydronaphthalene (8-Methyl-2-ethyltetralin).

B.p. 129–31°/14 mm.

Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 427.

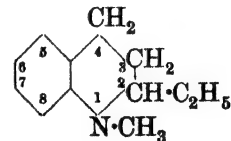
2-Methyl-1-ethyl-1 : 2 : 3 : 4-tetrahydroquinoline (N-Ethyl-1 : 2 : 3 : 4-tetrahydroquinoline)



$\text{C}_{12}\text{H}_{17}\text{N}$ MW, 175
d.
B.p. 256°. D_4^{20} 0.9942. $[\alpha]_D^{20} + 12.1^\circ$.
Benzyl iodide: orange-red leaflets from H_2O .
M.p. 161°.

Scholtz, Pawlicki, *Ber.*, 1905, **38**, 1295.

1-Methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydroquinoline



$\text{C}_{12}\text{H}_{17}\text{N}$ MW, 175
B.p. 265–7°/751 mm. n_D^{18} 1.5602. Volatile in steam.
 B_2HCl : needles. M.p. 207°. Very sol. H_2O , EtOH .

B_2HBr : cryst. M.p. 196°.

B_2HI : cryst. from $\text{EtOH} \cdot \text{Et}_2\text{O}$. M.p. 193°. Rapidly turns yellow in light.

Freund, Richard, *Ber.*, 1909, **42**, 1108.

3-Methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydroquinoline

707

3-Methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydroquinoline.

B.p. 260-2°/718 mm., 136-40°/12 mm. FeCl₃ → red col.

B, HCl: m.p. 193°.

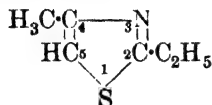
Doebner, Miller, *Ber.*, 1884, 17, 1716.

Braun, Heymons, *Ber.*, 1930, 63, 3202.

1-Methyl-4-ethyltetramethylene Glycol.

See Heptandiol-2 : 5.

4-Methyl-2-ethylthiazole



C₆H₉NS

MW, 127

B.p. 160.6-161°/728.5 mm.

B₂H₂PtCl₆: yellowish-red cryst. M.p. 177° decomp.

Hubacher, *Ann.*, 1890, 259, 230.

2-Methyl-4-ethylthiazole.

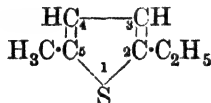
B.p. 169-71°/719 mm.

B₂H₂PtCl₆: reddish-yellow prisms. M.p. 182-3° decomp.

Picrate: m.p. 114-15°.

Rublew, *Ann.*, 1890, 259, 263.

5-Methyl-2-ethylthiophene (2-Methyl-5-ethylthiophene)



C₇H₁₀S

MW, 126

F.p. - 68.4° to - 68.6°. B.p. 159.8-160.4°/760 mm., 53-5°/22 mm. D₄²⁰ 0.9663, D₄³⁰ 0.9577. n_D²⁰ 1.5073, n_D³⁰ 1.5024.

Steinkopf, Schubart, *Ann.*, 1921, 424, 22.

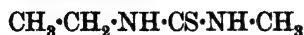
Shepard, *J. Am. Chem. Soc.*, 1932, 54, 2952.

5-Methyl-3-ethylthiophene (2-Methyl-4-ethylthiophene).

F.p. - 59° to - 60°. B.p. 162-4°/760 mm. D₄²⁰ 0.9742, D₄³⁰ 0.9650. n_D²⁰ 1.5098, n_D³⁰ 1.5048.

See second reference above.

sym.-Methylethylthiourea



C₄H₁₀N₂S

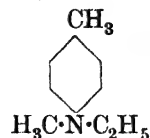
MW, 118

Cryst. M.p. 54°.

Hofmann, *Ber.*, 1868, 1, 27.

Methylethylvinylcarbinol

N-Methyl-N-ethyl-p-toluidine



C₁₀H₁₅N

MW, 149

B.p. 218-20°.

Picrate: yellow needles. M.p. 78°.

Wedekind, Oberheide, *Ber.*, 1904, 37, 2716.

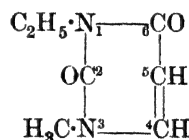
Methyl ethyl Triketone.

See Hexantrione-2 : 3 : 4.

1-Methyl-3-ethyltrimethylene Glycol.

See Hexandiol-2 : 4.

3-Methyl-1-ethyluracil



C₇H₁₀O₂N₂

MW, 154

M.p. 60-1°. B.p. 140-1°/4 mm. Very sol. H₂O, EtOH, Et₂O. Spar. sol. ligroin.

Hilbert, Johnson, *J. Am. Chem. Soc.*, 1930, 52, 2005.

4-Methyl-1-ethyluracil.

Needles from EtOH, prisms from ethyl bromide. M.p. 195°. Sol. CHCl₃, ethyl bromide. Spar. sol. cold H₂O, EtOH. Insol. Et₂O, ligroin. Alk. sol. decomp. on warming.

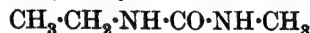
Hoffmann, *Ann.*, 1889, 253, 68.

5-Methyl-3-ethyluracil (3-Ethylthymine).

Needles from hot H₂O. M.p. 223°.

Schmidt-Nickels, Johnson, *J. Am. Chem. Soc.*, 1930, 52, 4515.

sym.-Methylethylurea



C₄H₁₀ON₂

MW, 102

M.p. 52-3°. B.p. 266-8°. (Schreiner, (*J. prakt. Chem.*, 1880, 22, 359) claims to have prepared two isomeric sym.-methylethylureas, m.p. 105° and 75° respectively.)

Wurtz, *J. prakt. Chem.*, 1851, 53, 48.

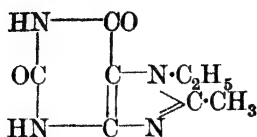
Methylethylvaleric Acid.

See 3-Methylhexane-3-carboxylic Acid and 3-Methylhexane-4-carboxylic Acid.

Methylethylvinylcarbinol.

See 3-Methyl-1-pentenol-3.

8-Methyl-7-ethylxanthine

 $C_8H_{10}O_2N_4$

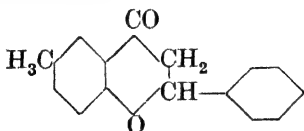
MW, 194

Cryst. from AcOH.Aq. M.p. 340° decomp.
Sol. alkalis. Insol. EtOH, Et₂O.

Diaz de Plaza, *Chem. Zentr.*, 1927, I, 2653.

Methyleugenol.

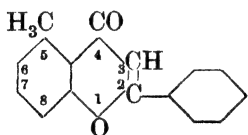
See under Eugenol.

6-Methylflavanone $C_{16}H_{14}O_2$

MW, 238

Plates from EtOH. M.p. 106-7°. Sol. CHCl₃, Et₂O, C₆H₆. Spar. sol. cold EtOH, ligroin, pet. ether. Conc. H₂SO₄ → yellow sol.

Auwers, Müller, *Ber.*, 1908, 41, 4240.

5-Methylflavone $C_{16}H_{12}O_2$

MW, 236

Plates from EtOH.Aq. M.p. 129-30°

Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1687.

6-Methylflavone.

Needles from pet. ether. M.p. 122-3°. Sol. EtOH. Spar. sol. pet. ether. Conc. H₂SO₄ → sol. with blue fluor.

Ruhemann, *Ber.*, 1913, 46, 2193.

7-Methylflavone.

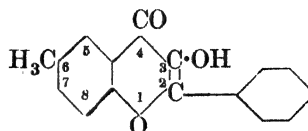
Yellow prisms from EtOH. M.p. 120°.

Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1687.

8-Methylflavone.

Needles from EtOH. M.p. 170°. Spar. sol. cold EtOH, C₆H₆. Almost insol. pet ether. conc. H₂SO₄ → yellow sol.

Ruhemann, *Ber.*, 1913, 46, 2192.

6-Methylflavonol $C_{16}H_{12}O_3$

MW, 252

Yellow plates from AcOH. M.p. 196-7°. Sol. C₆H₆, CHCl₃. Spar. sol. Et₂O, cold AcOH. Almost insol. cold EtOH. Conc. H₂SO₄ → yellow sol. Alkalis → intense yellow salts, spar. sol. H₂O.

Benzoyl: needles from MeOH. M.p. 167-8°. Conc. H₂SO₄ → yellow sol.

Auwers, Müller, *Ber.*, 1908, 41, 4239.

7-Methylflavonol.

Yellow needles from EtOH. M.p. 160°. Sol. EtOH, C₆H₆. Spar. sol. pet. ether. Sol. alkalis. Conc. H₂SO₄ → yellow sol. with blue fluor.

Acetyl: needles from EtOH.Aq. M.p. 122-3°.

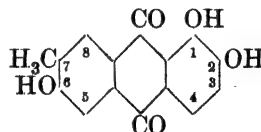
Auwers, Pohl, *Ann.*, 1914, 405, 292.

8-Methylflavonol.

Needles from EtOH. M.p. 181-2°. Sol. C₆H₆, AcOH. Spar. sol. cold EtOH, ligroin. Conc. H₂SO₄ → yellow sol. with blue fluor.

Acetyl: needles from EtOH.Aq. M.p. 161-2°.

Auwers, *Ber.*, 1916, 49, 815.

7-Methylflavopurpurin (3:7:8-Trihydroxy-2-methylanthraquinone) $C_{15}H_{10}O_5$

MW, 270

Reddish-brown needles from PhNO₂. M.p. 318-20°. Sol. alkalis with reddish-brown col. Conc. H₂SO₄ → brownish-red sol.

Tri-Me ether: C₁₈H₁₆O₅. MW, 312. Yellow needles from AcOH. M.p. 218°. Sol. C₆H₆, AcOH. Spar. sol. EtOH, Et₂O. Conc. H₂SO₄ → red sol.

Triacetyl: yellow needles from AcOH. M.p. 204-5°. Sol. AcOH. Mod. sol. Me₂CO, C₆H₆. Spar. sol. EtOH.

Bistrzycki, Krauser, *Helv. Chim. Acta*, 1923, 6, 759.

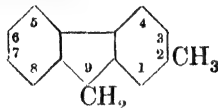
Keimatsu, Hirano, *Chem. Abstracts*, 1930, 24, 1373.

8-Methylflavopurpurin (3:7:8-Trihydroxy-1-methylanthraquinone).

Needles from PhNO_2 . M.p. above 330° . Sol. alkalis. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ violet sol.

Tri-Me ether: yellow needles from AcOH . M.p. 197° . Sol. AcOH , C_6H_6 . Spar. sol. EtOH , Me_2CO . Conc. $\text{H}_2\text{SO}_4 \rightarrow$ reddish-violet col.

See first reference above.

2-Methylfluorene

$\text{C}_{14}\text{H}_{12}$ MW, 180

Plates from EtOH . M.p. 104° . B.p. $317-19^\circ/760$ mm.

Kruber, *Ber.*, 1932, 65, 1395.

3-Methylfluorene.

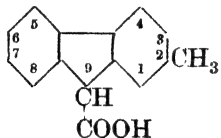
Plates from EtOH . M.p. 88° .

Sieglitz, Schatzkes, *Ber.*, 1921, 54, 2071.

9-Methylfluorene.

Prisms. M.p. $46-7^\circ$. B.p. $154-6^\circ/15$ mm. Sol. usual org. solvents. Insol. H_2O . Volatile in steam.

Wislicenus, Mocker, *Ber.*, 1913, 46, 2780.

2-Methylfluorene-9-carboxylic Acid

$\text{C}_{15}\text{H}_{12}\text{O}_2$ MW, 224

Needles from EtOH or toluene. M.p. $210-11^\circ$. Heat above m.p. \rightarrow 2-methylfluorene.

Me ester: $\text{C}_{16}\text{H}_{14}\text{O}_2$. MW, 238. Needles from EtOH . M.p. $104-5^\circ$.

Kruber, *Ber.*, 1932, 65, 1394.

3-Methylfluorene-9-carboxylic Acid.

Cryst. from C_6H_6 -pet. ether. M.p. about 210° decomp.

Vorländer, Pritzche, *Ber.*, 1913, 46, 1795.

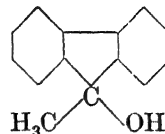
9-Methylfluorene-9-carboxylic Acid.

Plates from EtOH , needles from C_6H_6 . Sol. EtOH , Et_2O , hot AcOH . Spar. sol. pet. ether. Almost insol. hot H_2O . Heat at $250^\circ \rightarrow$ 9-methylfluorene. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ greenish-yellow sol. \rightarrow red on heating.

Me ester: $\text{C}_{16}\text{H}_{14}\text{O}_2$. MW, 238. Cryst. M.p. 33° . B.p. $188-90^\circ/14$ mm. Sol. usual

org. solvents. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ greenish yellow col. \rightarrow reddish-brown on heating.

Wislicenus, Mocker, *Ber.*, 1913, 46, 2779.

9-Methyl-9-fluorenone (Methyldiphenylene-carbinol)

$\text{C}_{14}\text{H}_{12}\text{O}$ MW, 196

Prisms from C_6H_6 . M.p. 174.5° . Sol. warm C_6H_6 , EtOH . Spar. sol. Et_2O , ligroin. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ brown sol.

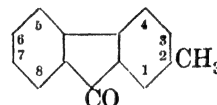
Et ether: $\text{C}_{16}\text{H}_{16}\text{O}$. MW, 224. Prisms from Et_2O . M.p. $85-6^\circ$ (84°).

Acetyl: prisms from Et_2O . M.p. 75° .

Benzoyl: cryst. from EtOH . M.p. 173° .

Daufresne, *Bull. soc. chim.*, 1907, 1, 1233.

Wieland, Cerezo, *Ann.*, 1927, 457, 249.

2-Methylfluorenone

$\text{C}_{14}\text{H}_{10}\text{O}$ MW, 194

Yellow needles from ligroin. M.p. 92° .

Kruber, *Ber.*, 1932, 65, 1394.

3-Methylfluorenone.

Yellow plates from EtOH . Aq. M.p. 68° (66.5°). Sol. most org. solvents. Spar. sol. ligroin. Insol. H_2O .

Ullmann, Mallet, *Ber.*, 1898, 31, 1694.

Methyl fluoride (Fluoromethane)

CH_3F MW, 59

B.p. $-78.2^\circ/760$ mm. Crit. temp. 44.55° (44.9°). Crit. press. 58.0 ± 0.2 atm. 100 vols. H_2O dissolve 166 vols. of the gas at 15° .

Moles, Batuecas, *J. chim. phys.*, 1919, 17, 537.

Cawood, Patterson, *J. Chem. Soc.*, 1932, 2180.

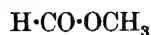
N-Methylformamide (Formylmethylamine)

$\text{C}_2\text{H}_5\text{ON}$ MW, 59

B.p. $180-5^\circ$. D_{20}^{20} 1.011. Sol. H_2O , EtOH . Insol. Et_2O .

Gautier, *Ann.*, 1869, 151, 241.

Schmidt, E.P., 252,460, (*Chem. Abstracts*, 1927, 21, 2273).

Methyl formate

$\text{C}_2\text{H}_4\text{O}_2$ MW, 60
F.p. — 99.0°. B.p. 31.50°. D_4^{20} 1.00317,
 D_4^{15} 0.98674, D_4^{30} 0.95973. n_D^{15} 1.34648.

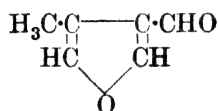
Young, Thomas, *J. Chem. Soc.*, 1893,
63, 1195.

Gesellschaft für Kohlentechnik, D.R.P.,
595,307, (*Chem. Abstracts*, 1934, 28,
4072).

Methylfumaric Acid.

See Mesaconic Acid.

4-Methyl- β -furaldehyde (4-Methylfuran-3-
aldehyde)



$\text{C}_6\text{H}_6\text{O}_2$ MW, 110

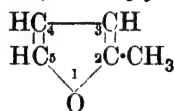
Oil. B.p. 55°/11 mm.

Semicarbazone: cryst. from EtOH.Aq. M.p.
217–18° decomp.

Hydrazone: cryst. M.p. about 44–5°.

Reichstein, Grüssner, *Helv. Chim. Acta*,
1933, 16, 35.

2-Methylfuran (α -Methylfurfuran, silvan)



$\text{C}_5\text{H}_6\text{O}$ MW, 82

Exists in two forms.

(i) B.p. 63–63.5°. D_4^{20} 0.9159. Misc. with
EtOH, Et₂O. Spar. sol. H₂O. Turns yellow
in air. Decomp. by strong NaOH.

(ii) B.p. 78.5–79°/42 mm. D_4^{18} 0.9406. n_D^{18}
1.457. Unstable. Alkalis \rightarrow (i).

Harries, *Ber.*, 1898, 31, 37.

Kizhner, *Chem. Abstracts*, 1932, 26, 5299.

Société anonyme des Distilleries des
Deux-Sèvres, F.P., 639,756, (*Chem.*
Abstracts, 1929, 23, 609).

3-Methylfuran (β -Methylfurfuran).

B.p. 65.5° (63–4°). D_4^{18} 0.923. n_D^{18} 1.4255.
Gives bluish-green col. with pine shavings.

Reichstein, Zschokke, *Helv. Chim. Acta*,
1931, 14, 1276.

Asahina, Tanaka, *Acta Phytochimica*, 1924,
2, 21, (*Chem. Zentr.*, 1924, II, 1694).

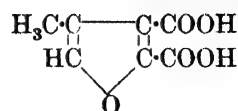
4-Methylfuran-3-aldehyde.

See 4-Methyl- β -furaldehyde.

Methylfuran-carboxylic Acid.

See Methyl- β -furoic Acid and Methylpyro-
mucic Acid.

4-Methylfuran-2 : 3-dicarboxylic Acid



$\text{C}_7\text{H}_6\text{O}_5$ MW, 170

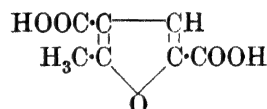
Cryst. from hot H₂O. M.p. 233° decomp.
Sublimes in high vacuo.

2-Amide: $\text{C}_7\text{H}_7\text{O}_4\text{N}$. MW, 169. Cryst.
from hot. H₂O. M.p. 228–30°.

2-Nitrile: $\text{C}_7\text{H}_5\text{O}_3\text{N}$. MW, 151. Cryst.
M.p. about 195–9°.

Reichstein, Zschokke, *Helv. Chim. Acta*
1931, 14, 1274.

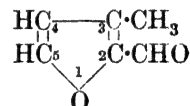
5-Methylfuran-2 : 4-dicarboxylic Acid



$\text{C}_7\text{H}_6\text{O}_5$ MW, 170

Cryst. M.p. 270–2°. Sublimes in vacuo.

Gilman, Calloway, Smith, *J. Am. Chem.*
Soc., 1934, 56, 221.

3-Methylfurfural

$\text{C}_6\text{H}_6\text{O}_2$ MW, 110

Oil. B.p. 60–1°/12 mm.

Oxime: m.p. 73–6°. B.p. about 106°/12 mm.

Semicarbazone: cryst. from EtOH. M.p.
216–18° decomp.

Reichstein, Zschokke, Georg, *Helv. Chim.*
Acta, 1931, 14, 1280.

5-Methylfurfural.

Oil. B.p. 187°/760 mm., 79–81°/12 mm.
 D_4^{18} 1.1072. Sol. 30 parts H₂O.

Oxime: *anti*, prisms from ligroin. M.p.
51–2°. *Syn*, needles from ligroin. M.p. 112°.

Semicarbazone: cryst. M.p. 210–11° (176–7°).

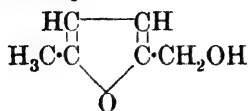
Phenylhydrazone: m.p. 147–8°.

p-Nitrophenylhydrazone: scarlet ppt. from
EtOH.Aq. M.p. 130°.

Rinkes, *Organic Syntheses*, 1934, XIV, 62.
Fromherz, Meigen, *Ber.*, 1907, 40, 404.

Reichstein, *Helv. Chim. Acta*, 1930, 13,
346.

5-Methylfurfuryl Alcohol

 $C_6H_8O_2$

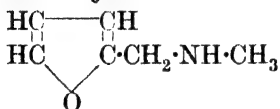
MW, 112

B.p. 194–6°/744 mm., slight decomp., 97–9°/36 mm., 70–3°/6 mm. D_4^{20} 1.0769. n_D^{20} 1.4853.

Diphenylurethane: cryst. from pet. ether. M.p. 52–3°.

Scott, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 2554.

N-Methylfurfurylamine

 C_6H_9ON

MW, 111

Oil. B.p. 65–7°/21 mm., 59–60°/25 mm. Strong base.

B.HCl: plates. M.p. 139°. Sol. H_2O , EtOH. Spar. sol. Et₂O, C_6H_6 .

B.HBr: needles or plates. M.p. 131°. Sol. EtOH. Insol. Et₂O.

N-Et: methylethylfurfurylamine. $C_8H_{13}ON$. MW, 139. B.p. 69–70°/23 mm. $B_2H_2PtCl_6$: m.p. 147°. Sol. H_2O . *Picrate*: m.p. 91°. Sol. EtOH. *Methiodide*: m.p. 101°. Sol. EtOH.

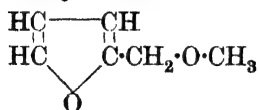
N-Benzoyl: b.p. 180–5°/5 mm.

Picrate: yellow needles from EtOH. M.p. 144°. Sol. H_2O , EtOH.

Schwabbauer, *Ber.*, 1902, **35**, 411.

v. Braun, Köhler, *Ber.*, 1918, **51**, 86.

Methyl furfuryl Ether

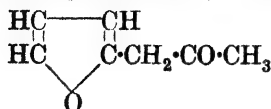
 $C_6H_8O_2$

MW, 112

B.p. 134–5°/762 mm. D_4^{20} 1.0163. n_D^{20} 1.4570.

Kirner, *J. Am. Chem. Soc.*, 1928, **50**, 1958.

Methyl furfuryl Ketone (1-Acetonilyfuran)

 $C_7H_8O_2$

MW, 124

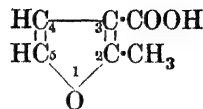
B.p. 179–80°. Sol. dil. HCl.

Oxime: b.p. 135–40°/25 mm.

Semicarbazone: cryst. M.p. 173–4°.

Darzens, *Compt. rend.*, 1906, **142**, 215.

2-Methyl-β-furoic Acid (2-Methylfuran-3-carboxylic acid)

 $C_6H_6O_3$

MW, 126

Cryst. from H_2O . M.p. 102–3°. Sol. EtOH, Et₂O, AcOH, pet. ether.

Et ester: $C_8H_{10}O_3$. MW, 154. B.p. 85–7°/20 mm.

Hydrazide: m.p. 149.5–150°.

Benary, *Ber.*, 1911, **44**, 496.

Gilman, Burtner, Smith, *Rec. trav. chim.*, 1932, **51**, 407.

4-Methyl-β-furoic Acid (4-Methylfuran-3-carboxylic acid).

Needles from C_6H_6 -pet. ether. M.p. 138–9°. Sol. H_2O . No ppt. with $FeCl_3$. Not acid to Congo.

Chloride: $C_6H_5O_2Cl$. MW, 144.5. B.p. 59°/11 mm.

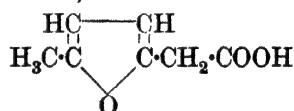
Reichstein, Zschokke, *Helv. Chim. Acta*, 1931, **14**, 1275.

5-Methyl-β-furoic Acid (5-Methylfuran-3-carboxylic acid).

Cryst. from hot H_2O . M.p. 119°.

Gilman, Burtner, Smith, *J. Am. Chem. Soc.*, 1933, **55**, 405.

5-Methyl-α-furylacetic Acid (5-Methylfuran-2-acetic acid)

 $C_7H_8O_3$

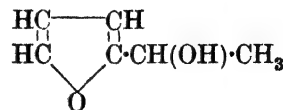
MW, 140

Needles from pet. ether. M.p. 61–2° (57–8°). Sol. H_2O .

Nitrile: oil. B.p. 79–84°/10 mm.

Reichstein, Zschokke, *Helv. Chim. Acta*, 1932, **15**, 252.

Methyl-2-furylcarbinol (2-α-Hydroxyethylfuran)

 $C_6H_8O_2$

MW, 112

B.p. 76–7°/23 mm. D_4^{25} 1.0771. n_D^{25} 1.4785.

Peters, Fischer, *J. Am. Chem. Soc.*, 1930, **52**, 2081.

Methyl 2- α -furylethyl Ketone.

See Furfurylacetone.

Methyl α -furyl Ketone.

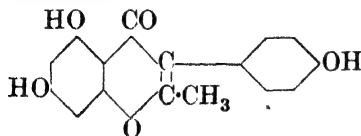
See 2-Acetofurone.

Methylgalactoside.

See under Galactose.

Methylgallic Acid. 4 : 5-Dihydroxy-3-methoxybenzoic Acid.

See under Gallic Acid.

2-Methylgenistein (2-Methylprunetol, 5 : 7 : 4'-trihydroxy-2-methyl isoflavone) $C_{16}H_{12}O_5$

MW, 284

Needles + H_2O from EtOH.Aq. M.p. 258-9° slight decomp. $FeCl_3 \rightarrow$ violet col., changing to brownish-green. Conc. $H_2SO_4 \rightarrow$ pale yellow sol. with bluish-green fluor.

4'-Me ether : $C_{17}H_{14}O_5$. MW, 298. Prisms from EtOH. M.p. 205°. Colourless sols in alkalis. Alc. $FeCl_3 \rightarrow$ reddish-violet col. changing to brownish-green. Conc. $H_2SO_4 \rightarrow$ sol. with weak blue fluor. Diacetyl : needles from EtOH. M.p. 208-9°.

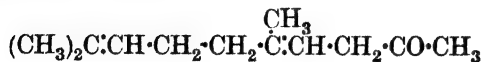
7 : 4'-Di-Me ether : $C_{18}H_{16}O_5$. MW, 312. Needles from EtOH. M.p. 197-9°.

Tri-Me ether : $C_{19}H_{18}O_5$. MW, 326. M.p. 175-6°. Conc. $H_2SO_4 \rightarrow$ pale yellow sol. with blue fluor. No col. with $FeCl_3$.

7 : 4'-Diacetyl : pink prisms from AcOH. M.p. 171°. Violet col. with alc. $FeCl_3$.

Triacetyl : needles from EtOH. M.p. 214°. Spar. sol. EtOH.

Baker, Robinson, *J. Chem. Soc.*, 1926, 2716.

Methyl geranyl Ketone $C_{12}H_{20}O$

MW, 180

B.p. 238°/721 mm., 94°/2 mm. D_{15}^{20} 0.8796. n_D^{20} 1.4598.

Barbier, *Helv. Chim. Acta*, 1934, 17, 1028.

Methyl-glucoheptoside.

See under Glucoheptose.

Methyl-glucoheptuloside.

See under Glucoheptulose.

Methylglucoside.

See under Glucose.

α -Methylglutaconic Acid (3-Methylglutaconic acid, 1-butylene-1 : 3-dicarboxylic acid)

 $C_6H_8O_4$

MW, 144

Cis :

Cryst. from ligroin. M.p. 118°. Sol. $CHCl_3$, Et_2O . Acids or alkalis \rightarrow *trans*-form.

Anhydride : needles from Et_2O . M.p. 85°. Sol. $CHCl_3$, AcOEt. Spar. sol. Et_2O .

Mono-anilide : $C_{12}H_{13}O_3N$. MW, 219. Needles from EtOH.Aq. M.p. 148°. Loses CO_2 above m.p. Heat at 150° \rightarrow *trans*-form.

Trans :

Prisms from H_2O . M.p. 145-6°. Very sol. warm H_2O . Sol. EtOH. Spar. sol. $CHCl_3$. Less sol. Et_2O , AcOEt than *cis*-form.

Di-Et ester : $C_{16}H_{16}O_4$. MW, 200. B.p. 244°/754 mm., 165°/60 mm.

Monoamide : $C_6H_9O_3N$. MW, 143. Plates + H_2O from H_2O . M.p. 182-3° decomp. Sol. H_2O . Spar. sol. EtOH. Almost insol. AcOEt.

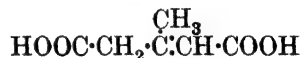
Mono-anilide : $C_{12}H_{13}O_3N$. MW, 219. Needles from AcOEt. M.p. 189°. Loses CO_2 at 195°.

Thole, Thorpe, *J. Chem. Soc.*, 1911, 99, 2215.

Feist, Pommé, *Ann.*, 1909, 370, 61.

Thorpe, Wood, *J. Chem. Soc.*, 1913, 103, 1582.

β -Methylglutaconic Acid (2-Methylpropylene-1 : 3-dicarboxylic acid, isobutylene-1 : 3-dicarboxylic acid, 2-methylglutaconic acid)

 $C_6H_8O_4$

MW, 144

Cis :

Prisms from H_2O . M.p. 147-9°. Sol. H_2O , EtOH. Spar. sol. Et_2O , $CHCl_3$. Insol. C_6H_6 . $k = 1.29 \times 10^{-4}$ at 25°. Sublimes.

Mono-Et ester : $C_8H_{12}O_4$. MW, 172. Needles from C_6H_6 -pet. ether. M.p. 73°. Sol. most org. solvents.

Di-Et ester : $C_{10}H_{16}O_4$. MW, 200. B.p. 165°/70 mm., 131°/9 mm. D_4^{20} 1.034. n_D^{20} 1.452.

Anhydride : needles from pet. ether, cryst. from $CHCl_3$. M.p. 86°.

Mono-anilide : $C_{12}H_{13}O_3N$. MW, 219. Needles from C_6H_6 . M.p. 143°. Spar. sol. C_6H_6 . Heat at 150° \rightarrow hydroxyanil.

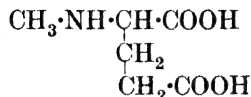
Trans :

Cryst. M.p. 115-16°. Spar. sol. cold $CHCl_3$. $k = 1.39 \times 10^{-4}$ at 25°.

Di-Et ester: b.p. 167°/68 mm., 127°/12 mm.
 D_4^{20} 1.034. n_D^{20} 1.452.

Bland, Thorpe, *J. Chem. Soc.*, 1912, 101, 865, 1557.

N-Methylglutamic Acid (1-Methylamino-glutaric acid)



$\text{C}_6\text{H}_{11}\text{O}_4\text{N}$ MW, 161
 Rhombohedra from H_2O . M.p. 156–8°. Decomp. at 200°.

B.HCl: cryst. M.p. 210–13° (159–60°).

Di-Et ester: $\text{C}_{10}\text{H}_{19}\text{O}_4\text{N}$. MW, 217. B.p. 108–9°/2 mm. Misc. with H_2O .

N-Acetyl: cryst. from AcOH. Decomp. at 203°.

N-p-Toluenesulphonyl: cryst. from toluene-EtOH. M.p. 131–2°.

Knoop, Oesterlin, *Z. physiol. Chem.*, 1927, 170, 186.

Sugasawa, *Chem. Zentr.*, 1928, I, 1646.

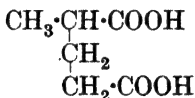
2-Methylglutaraldehyde (2-Methylglutaric dialdehyde, 1:3-dialdehydoisobutane, 2-methylpropane-1:3-diol, isobutane-1:3-dialdehyde)



$\text{C}_6\text{H}_{10}\text{O}_2$ MW, 114
 Oil. B.p. 220°, 140–60°/20 mm. Forms bisulphite comp.

Riban, *Bull. soc. chim.*, 1872, 18, 63.

1-Methylglutaric Acid (Butane-1:3-dicarboxylic acid)



$\text{C}_6\text{H}_{10}\text{O}_4$ MW, 146

Prisms from H_2O . M.p. 79° (77–8°). B.p. 205–8°/12 mm. Sol. H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 . Heat of comb. C_p 670.5 Cal. $k = 5.4 \times 10^{-5}$ at 25°.

1-Nitrile: $\text{C}_6\text{H}_9\text{O}_2\text{N}$. MW, 127. Prisms from H_2O . M.p. 95–6°. Sol. H_2O , C_6H_6 , CHCl_3 . Mod. sol. Et_2O . *Et ester*: $\text{C}_8\text{H}_{13}\text{O}_2\text{N}$. MW, 155. B.p. 210°.

Dinitrile: $\text{C}_6\text{H}_8\text{N}_2$. MW, 108. B.p. 269–71°, 134°/13 mm. Sol. H_2O , EtOH, Et_2O .

Anhydride: oil. B.p. 272–5°.

Monoanilide: $\text{C}_{12}\text{H}_{15}\text{O}_3\text{N}$. MW, 221. Exists in two forms. (i) M.p. 114–15°. (ii) M.p. about 100°.

Dianilide: needles from EtOH.Aq. M.p. 175–6°. Spar. sol. Et_2O , C_6H_6 , AcOH.

Mono-p-toluidide: $\text{C}_{13}\text{H}_{17}\text{O}_3\text{N}$. MW, 235. Exists in two forms. (i) Cryst. from Et_2O . M.p. 126°. (ii) Cryst. from Et_2O . M.p. 98–9°. More sol. than first form.

Di-p-toluidide: needles from EtOH. M.p. 174–5°. Sol. EtOH, AcOH. Spar. sol. Et_2O . Almost insol. C_6H_6 .

Mono-2-naphthalide: plates from EtOH. M.p. 115–19°. Sol. EtOH, Et_2O . Spar. sol. C_6H_6 .

Di-2-naphthalide: cryst. from EtOH. M.p. 227–8°.

Howles, Udall, Thorpe, *J. Chem. Soc.*, 1900, 77, 947.

Franke, Kohn, *Monatsh.*, 1902, 23, 745.

Auwers, *Ann.*, 1896, 292, 210.

2-Methylglutaric Acid (Isobutane-1:3-dicarboxylic acid, ethylidene-diacetic acid)



$\text{C}_6\text{H}_{10}\text{O}_4$ MW, 146

Prisms and plates from $\text{CHCl}_3\text{--CS}_2$. M.p. 87°. Sol. H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 , CHCl_3 . Almost insol. CS_2 , ligroin. $k = 6.00 \times 10^{-5}$ at 25°.

Et ester: nitrile, $\text{C}_8\text{H}_{13}\text{O}_2\text{N}$. MW, 155. B.p. 205°.

Dinitrile: $\text{C}_6\text{H}_8\text{N}_2$. MW, 108. B.p. 140°/10 mm.

Anhydride: prisms from CS_2 . M.p. 41°. B.p. 276–8°, 180–2°/25 mm. Sol. EtOH, Et_2O , CHCl_3 , C_6H_6 , AcOH. Spar. sol. cold H_2O , pet. ether.

Monoanilide: cryst. from H_2O or C_6H_6 . M.p. 121° (117°).

Mono-p-toluidide: needles from hot H_2O . M.p. 135°.

Mono-1-naphthalide: cryst. from hot EtOH.Aq. M.p. 170.5°. Sol. H_2O , most org. solvents except ligroin, CS_2 .

Mono-2-naphthalide: needles. M.p. 143°. Sol. C_6H_6 , hot H_2O , EtOH, CHCl_3 . Insol. Et_2O , ligroin.

Blaise, Gault, *Bull. soc. chim.*, 1907, 1, 88.

Darbishire, Thorpe, *J. Chem. Soc.*, 1905, 87, 1717.

Komppa, *Chem. Abstracts*, 1931, 25, 3625.

2-Methylglyceric Acid.

See 1:2-Dihydroxybutyric Acid.

1-Methylglycerol (1:2:3-Trihydroxybutane)



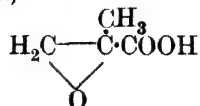
$\text{C}_4\text{H}_{10}\text{O}_3$ MW, 106

1-Methylglycidic Acid

Liq. with sweet taste. B.p. 172–5°/27 mm., 110–12°/11 mm. n_D 1.4462.

Gilchrist, Purves, *J. Chem. Soc.*, 1925, 127, 2744.

1-Methylglycidic Acid (*Propylene oxide 2-carboxylic acid*)



$\text{C}_4\text{H}_6\text{O}_3$ MW, 102

d.

Syrup.

K salt: plates from EtOH. $[\alpha]_D^{20}$ –17.6° in H_2O . Sol. EtOH.

dl.

Liq. Sol. H_2O , EtOH, Et_2O .

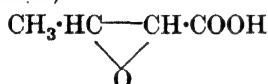
K salt: plates. Sol. H_2O , hot EtOH.

Et ester: $\text{C}_6\text{H}_{10}\text{O}_3$. MW, 130. B.p. 162–4°. D^{20} 1.0686, D^{15} 1.0546. Insol. H_2O .

Melikow, Zelinsky, *Ber.*, 1888, 21, 2053.

Kay, *J. Chem. Soc.*, 1909, 95, 562.

2-Methylglycidic Acid (*Propylene oxide 1-carboxylic acid*)



$\text{C}_4\text{H}_6\text{O}_3$ MW, 102

Exists in two forms.

(i) Prisms from Et_2O . M.p. 84°. Very sol. H_2O , EtOH, Et_2O .

Et ester: $\text{C}_6\text{H}_{10}\text{O}_3$. MW, 130. B.p. 172–4°. D^{20} 1.0658, D^{15} 1.0534. Insol. H_2O .

(ii) 2-Methylisoglycidic Acid.

K salt: prisms + H_2O from H_2O . M.p. 82°.

See previous references and also

Kaufmann, D.R.P., 528,506, (*Chem. Abstracts*, 1931, 25, 5178).

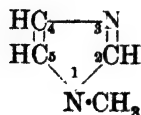
Methylglycine.

See Sarcosine.

Methylglyoxal.

See Pyruvic Aldehyde.

1-Methylglyoxaline (1-Methyliminazole, oxalmethylene)



$\text{C}_4\text{H}_6\text{N}_2$ MW, 82

F.p. –6°. B.p. 195–6°, 94–5°/14–15 mm. D^{20} 1.0363. Misc. with H_2O .

714 2-Methylglyoxaline-4-carboxylic Acid

$\text{B}_2\text{H}_2\text{PtCl}_6$: orange-red needles or prisms. M.p. 190–1°.

B.HAuCl_4 : yellow cryst. M.p. 118–20°.

$\text{B}_2\text{H}_2\text{ZnCl}_2$: cryst. M.p. 128–31°. Sol. H_2O . Mod. sol. EtOH. Insol. Et_2O .

Picrate: yellow needles. M.p. 158–9°.

Methiodide: solid. Very hygroscopic.

$\text{B}_2\text{H}_2\text{PtCl}_6$: plates. M.p. 202–3° decomp.

Wohl, Marckwald, *Ber.*, 1889, 22, 1359.

Sarasin, *Helv. Chim. Acta*, 1923, 6, 374.

2-Methylglyoxaline (2-Methyliminazole, glyoxalethyline, para-oxalmethylene).

Needles from C_6H_6 . M.p. 136°. B.p. 267°. Sol. H_2O , EtOH. Spar. sol. cold C_6H_6 .

Picrate: needles from boiling H_2O . M.p. 213°.

Acid oxalate: prisms from H_2O . M.p. 160°.

Radziszewski, *Ber.*, 1883, 16, 488.

Fargher, Pyman, *J. Chem. Soc.*, 1919, 115, 231.

4-Methylglyoxaline (4(5)-Methyliminazole, 5-methylglyoxaline).

Cryst. M.p. 56°. B.p. 263°, 120–5°/0.02 mm. Sol. H_2O , EtOH.

B.HNO_3 : plates or needles. M.p. 110° decomp.

N-Benzoyl: needles. M.p. 54–5°. Very sol. EtOH, Et_2O , Me_2CO , C_6H_6 . Sol. pet. ether, ligroin.

B.HAuCl_4 : prisms. M.p. 200–1°. Spar. sol. cold H_2O .

Picrate: yellow cryst. from H_2O . M.p. 159–60°.

Gabriel, Pinkus, *Ber.*, 1893, 26, 2205.

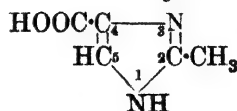
Yabuta, Kambe, *Chem. Abstracts*, 1930, 24, 3509.

Weidenhagen, Herrmann, *Chem. Zentr.*, 1935, I, 2982.

Methylglyoxaline-acetic Acid.

See Methyliminazolylacetic Acid.

2-Methylglyoxaline-4-carboxylic Acid (2-Methyliminazole-4-carboxylic acid)



$\text{C}_5\text{H}_6\text{O}_2\text{N}_2$ MW, 126

Prisms + H_2O from H_2O . M.p. 262°. Sol. 20 parts boiling H_2O . Insol. usual org. solvents.

B.HCl : prisms from H_2O . M.p. 268°.

B.HNO_3 : prisms from H_2O . M.p. 190° (240°).

Et ester: $\text{C}_7\text{H}_{10}\text{O}_2\text{N}_2$. MW, 154. Needles

from AcOEt. M.p. 156°. Sol. EtOH, AcOEt. Spar. sol. H₂O.

Anilide: needles + H₂O from H₂O. M.p. anhyd. 208°.

Picrate: cubes + 2H₂O from H₂O. M.p. 200–224°.

Fargher, Pyman, *J. Chem. Soc.*, 1919, 115, 230, 1017.

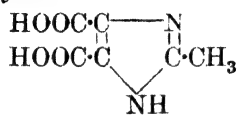
1-Methylglyoxaline-5-carboxylic Acid (1-Methyliminazole-5-carboxylic acid).

Me ester: C₆H₈O₂N₂. MW, 140. Prisms from MeOH. M.p. 68–70°. Sol. H₂O, EtOH, CHCl₃. Spar. sol. cold Et₂O. *Picrate*: yellow prisms from H₂O. M.p. 171°. Spar. sol. cold H₂O, MeOH, EtOH.

Picrate: leaflets from H₂O. M.p. 198–9°. Spar. sol. H₂O, EtOH.

Hubball, Pyman, *J. Chem. Soc.*, 1928, 28.

2-Methylglyoxaline-4:5-dicarboxylic Acid (2-Methyliminazole-4:5-dicarboxylic acid)



C₆H₆O₄N₂ MW, 170

Needles and prisms from H₂O. Decomp. about 300°. Sol. 200 parts boiling H₂O. Very hygroscopic.

K salt: needles. M.p. 271°. Spar. sol. cold H₂O.

Di-Et ester: C₁₀H₁₄O₄N₂. MW, 226. Needles. M.p. 88°. Sol. H₂O, EtOH, CHCl₃.

5-Chloride: C₆H₅O₃N₂Cl. MW, 188.5. Plates. M.p. above 300°. Insol. EtOH, Et₂O, CHCl₃.

B,HCl: m.p. 187°. Sol. H₂O, EtOH, CHCl₃. Insol. Et₂O.

Tamamushi, *Chem. Abstracts*, 1934, 28, 150.

Fargher, Pyman, *J. Chem. Soc.*, 1919, 115, 229.

Methylglyoxime (Pyruvic aldehyde dioxime)



C₃H₆O₂N₂ MW, 102

Prisms from EtOH. M.p. 157° (153°). Sol. EtOH, Et₂O. Spar. sol. cold H₂O. Sublimes in needles.

Mono-Me ether: C₄H₈O₂N₂. MW, 116. M.p. 98–9°. *Acetyl*: m.p. 43°.

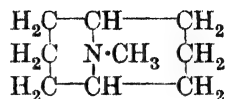
Di-Me ether: C₂H₁₀O₂N₂. MW, 130. B.p. 145.5–146.5°

Dibenzoyl: needles. M.p. 164–5°.

Avogadro, Tavola, *Gazz. chim. ital.*, 1925, 55, 323.

Ponzio, *Gazz. chim. ital.*, 1921, 51, ii, 213.

N-Methylgranatanine



C₉H₁₇N MW, 139

Cryst. M.p. 55–8° (50°). B.p. 192–3°/763 mm. (196–9°/725 mm.), 78.5°/15 mm. Sol. H₂O, EtOH, Et₂O, C₆H₆, pet. ether. Stable to KMnO₄.

B,H AuCl₄: yellow needles from H₂O. M.p. 243–4° decomp. Spar. sol. H₂O.

B₂H₂PtCl₆: prisms. M.p. 220–1° decomp. Sol. H₂O.

Picrate: yellow plates from EtOH.Aq. M.p. about 300°.

Methiodide: prisms from H₂O. M.p. above 330°.

Ciamician, Silber, *Ber.*, 1893, 26, 2744.

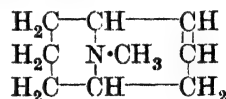
Piccinini, *Gazz. chim. ital.*, 1902, 32, i, 262.

Willstätter, Veraguth, *Ber.*, 1905, 38, 1986.

N-Methylgranataninol.

See N-Methylgranatoline.

N-Methylgranatenine



C₉H₁₅N MW, 137

Cryst. M.p. 17.2–17.4°. B.p. 186–186.5°/732 mm., 62.0–62.2°/9 mm. D₄²⁰ 0.961.

B,H AuCl₄: cryst. from dil. HCl. M.p. 220° decomp.

B₂H₂PtCl₆: prisms from H₂O. M.p. 221° decomp. Spar. sol. H₂O.

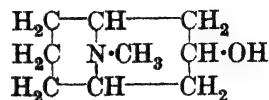
Picrate: cryst. M.p. 236° decomp.

Methiodide: cryst. from H₂O. M.p. above 315°. Sol. 3 parts hot H₂O, 20–25 parts at 20°. Spar. sol. EtOH. Insol. CHCl₃.

Ciamician, Silber, *Ber.*, 1893, 26, 2750.

Willstätter, Waser, *Ber.*, 1911, 44, 3431.

N-Methylgranatoline (N-Methylgranataninol)



C₉H₁₇ON MW, 155

Exists in two stereoisomeric forms.

I. ψ -Methylgranatoline.

Cryst. from pet. ether. M.p. 100°. B.p. 251°.

$B,HAuCl_4$: yellow needles from H_2O . M.p. 213°.

Methiodide: plates from H_2O . M.p. 307°. Spar. sol. hot H_2O .

Benzoyl: needles. M.p. 34°. B.p. 230°/24 mm. Sol. org. solvents. B,HCl : m.p. 235°. Sol. H_2O . Spar. sol. cold EtOH. B,HI : prisms from H_2O . M.p. 242-3°. B_2,H_2SO_4 : cryst. + $3H_2O$. M.p. 181°. B,HNO_3 : cryst. M.p. 227°. *Methiodide*: m.p. above 300°.

N-Oxide: $C_8H_{17}O_2N$. MW, 171. Cryst. from Me_2CO-Et_2O . M.p. 218°. $SO_2 \rightarrow$ methylgranatoline. B,HCl : m.p. 210°. *Picrate*: m.p. 254°.

Cinnamoyl: cryst. M.p. 62-3°.

p-Nitrobenzoyl: needles from H_2O . M.p. 149-50°.

p-Aminobenzoyl: cryst. M.p. 194-6°.

Tropic acid ester: B,HBr , cryst. from EtOH. M.p. 220°. Sol. H_2O . Spar. sol. cold EtOH. Anæsthetic.

II. Isomethylgranatoline.

Prisms from pet. ether. M.p. 69-70° (65°). More sol. than first form. $KMnO_4 \rightarrow \psi$ -pelle-tierine.

$B,HAuCl_4$: prisms from H_2O . M.p. 210-11° decomp.

Benzoyl: B,HCl , needles from EtOH. M.p. about 182°.

Tropic acid ester: B,HBr , cryst. from EtOH. M.p. 233°. Sol. H_2O , hot EtOH. Becomes yellow on exposure to light. Anæsthetic.

Mandelic acid ester: B,HBr , cryst. from EtOH. M.p. 229°. Sol. H_2O . Spar. sol. cold EtOH. Anæsthetic.

Ciamician, Silber, *Ber.*, 1893, 26, 2741.

Willstätter, Veraguth, *Ber.*, 1905, 38, 1989.

Werner, *J. Am. Chem. Soc.*, 1918, 40, 671.

Tanret, *Compt. rend.*, 1923, 176, 1659.

Polonovski, Polonovski, *Bull. soc. chim.*, 1927, 41, 1186.

N-Methylgranatonine.

See ψ -Pelletierine.

Methylguaiacol.

See Creosol and under 2 : 3-Dihydroxytoluene and Homocatechol.

Methylguanidine



$C_2H_7N_3$

MW, 73

Product of putrefaction. Solid. Strongly basic. Easily decomp. Poisonous. Reduces $KMnO_4$. $KOH \rightarrow$ methylamine + NH_3 .

Formyl deriv.: m.p. 122°.

Acetyl deriv.: cryst. from EtOH. M.p. 171-2°. B,HCl : m.p. 172°.

B,HNO_3 : cryst. from EtOH. M.p. 148-9°.

B,HNO_2 : m.p. 150°.

B_2,H_2SO_4 : cryst. from H_2O . M.p. 238°.

$B,HAuCl_4$: yellow cryst. M.p. 198-200°.

B_2,H_2PtCl_6 : yellowish-red prisms. M.p. 194-5°.

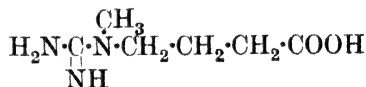
Picrate: yellow plates or needles from H_2O . M.p. 201.5° (200°).

Traube, Gorniak, *Z. angew. Chem.*, 1929, 42, 379.

Methylguanidinoacetic Acid.

See Creatine.

Methylguanidinobutyric Acid



$C_6H_{13}O_2N_3$ MW, 159

Prisms from H_2O . M.p. 307°. Sol. 20 parts H_2O at 100°, 120 parts at 25°.

B,HCl : cryst. from H_2O . M.p. 117-26°. Very sol. H_2O .

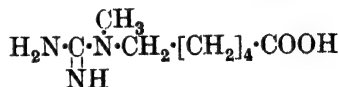
B_2,H_2SO_4 : prisms. M.p. 245-6° decomp. Sol. 5 parts hot H_2O . Spar. sol. EtOH.

B,HNO_3 : cryst. M.p. 123-33°.

B_2,H_2PtCl_6 : cryst. from H_2O . M.p. 190-1°.

Gansser, *Z. physiol. Chem.*, 1909, 61, 61.

Methylguanidinocaproic Acid



$C_8H_{17}O_2N_3$ MW, 187

Cryst. Decomp. about 285°. Sol. 69 parts H_2O at 20°. Sol. boiling EtOH.

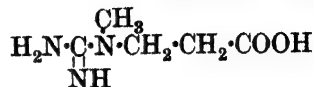
B,HCl : needles from EtOH- Et_2O . M.p. 105° decomp. Very sol. H_2O , EtOH.

B,HNO_3 : m.p. 80-5°.

Acid oxalate: cryst. M.p. 167-8° decomp. Very sol. hot H_2O . Spar. sol. cold EtOH. Insol. Et_2O .

Thomas, Goerne, *Z. physiol. Chem.*, 1919, 104, 79.

Methylguanidinopropionic Acid



$C_5H_{11}O_2N_3$

MW, 145

Prisms + H₂O from H₂O. M.p. anhyd. 201-2° decomp. Sol. hot H₂O.

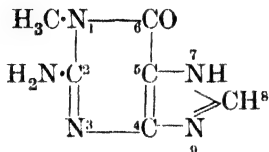
B, HCl: m.p. 160°. Very sol. H₂O, EtOH. Dissociates in aq. sol.

B₂, H₂SO₄: needles from EtOH. Aq. Decomp. at 145°.

B₂, H₂PtCl₆: cryst. M.p. 195° decomp. Spar. sol. cold H₂O.

Gansser, *Z. physiol. Chem.*, 1909, **61**, 43.

1-Methylguanine (2-Amino-1-methylhypoxanthine)



C₆H₇ON₅ MW, 165

Plates or needles from 50% AcOH. Sol. acids. Spar. sol. H₂O, NH₃. Insol. EtOH, Et₂O, CHCl₃. HNO₂ → 1-methylxanthine.

B, HCl: plates from dil. HCl.

B₂, H₂SO₄: needles.

B, HNO₃: prisms from dil. HNO₃.

B₂, H₂PtCl₆: yellow needles from dil. HCl.

Bayer, D.R.P., 262,470, (*Chem. Zentr.*, 1913, II, 633).

Traube, Dudley, *Ber.*, 1913, **46**, 3845.

7-Methylguanine (Epiguanine, 6-hydroxy-2-aminopurine, 2-amino-7-methylhypoxanthine).

Needles from H₂O. Decomp. on heating. Sol. dil. HCl, H₂SO₄. Less sol. dil. HNO₃. Sol. 900 parts boiling H₂O. HNO₂ → 7-methylxanthine. KClO₃ + HCl → guanidine.

B, HClO₄: needles.

B₂, H₂PtCl₆: prisms.

Picrate: decomp. at 257°. Sol. 2740 parts H₂O at 18°.

Fischer, *Ber.*, 1898, **31**, 544.

8-Methylguanine (2-Amino-8-methylhypoxanthine).

Prisms from H₂O. Sol. H₂O. Spar. sol. EtOH, Et₂O.

B, HCl: prisms + H₂O from conc. HCl.

B₂, H₂SO₄: plates.

B, HNO₃: oval plates.

Traube *et al.*, *Ann.*, 1923, **432**, 283.

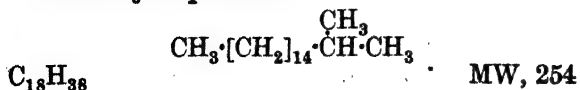
Methylguloside.

See under Gulose.

N-Methylguvacine.

See Arecaidine.

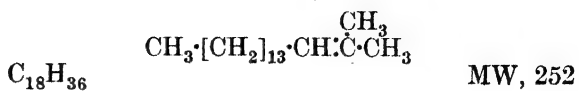
2-Methylheptadecane



B.p. 311°, 178.5°/15 mm. D₁₅ 0.7838. n_D¹⁴ 1.4394.

Landa, Riedl, *Chem. Zentr.*, 1931, I, 2454.

2-Methyl-2-heptadecylene

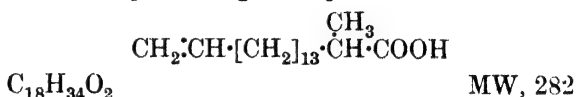


M.p. -2.5°. B.p. 314°, 277°/100 mm. D₂₀ 0.7953. Ox. → acetone + pentadecylic acid.

Dibromide: b.p. 267-8°/28 mm.

See previous reference.

1-Methyl-15-heptadecylenic Acid

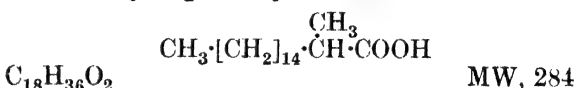


Needles from pet. ether. M.p. 43-43.5°. B.p. 186-7°/3 mm.

Me ester: C₁₉H₃₆O₂. MW, 294. B.p. 158-9°/3 mm. D₁₅ 0.876.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, **10**, 131.

1-Methylheptadecylic Acid



M.p. 34-5° (51°). B.p. 179-83°/5 mm.

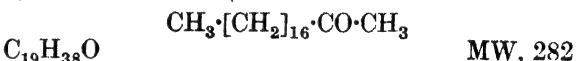
Stanley, Jay, Adams, *J. Am. Chem. Soc.*, 1929, **51**, 1265.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1927, **46**, 153.

15-Methylheptadecylic Acid.

See Isostearic Acid.

Methyl heptadecyl Ketone (Nonadecanone-2, 2-ketononadecane)

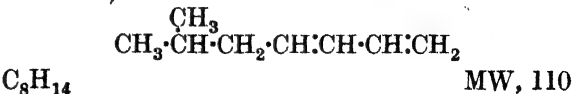


Leaflets from EtOH. M.p. 55-6°. B.p. 266.5°/110 mm. D₁₆ 0.8108. Sol. EtOH, Et₂O, Me₂CO, CHCl₃, ligroin. Slowly reduces NH₃.AgNO₃ and Fehling's.

Oxime: cryst. from EtOH. M.p. 76°.

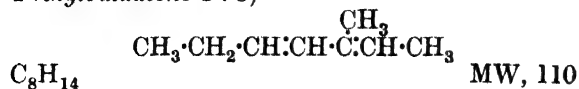
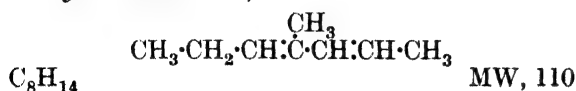
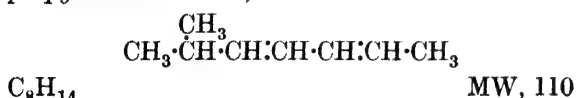
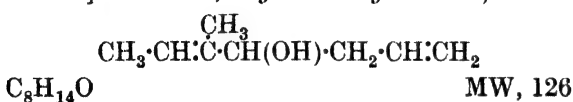
Thoms, Vogelsang, *Ann.*, 1907, **357**, 161.

6-Methyl-1 : 3-heptadiene (1-Isobutyl-1 : 3-butadiene)

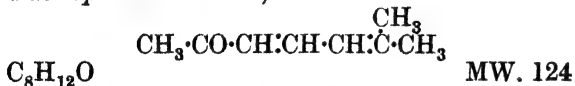


B.p. 116-18°. D₂₂ 0.741.

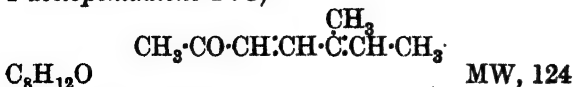
Fournier, *Bull. soc. chim.*, 1896, **15**, 401.

3-Methyl-2 : 4-heptadiene (1 : 2-Dimethyl-4-ethylbutadiene-1 : 3)B.p. 132–5°. D_4^{15} 0.7667. n_D^{15} 1.4649.Abelmann, *Ber.*, 1910, **43**, 1585.**4-Methyl-2 : 4-heptadiene** (2 : 4-Dimethyl-1-ethylbutadiene-1 : 3)B.p. 131–2°. D_4^{25} 0.7551. n_D^{25} 1.4621.Bjelouss, *Ber.*, 1910, **43**, 2332.**6-Methyl-2 : 4-heptadiene** (1-Methyl-4-isopropylbutadiene-1 : 3)B.p. 114–16°. D_4^{25} 0.7401. n_D^{25} 1.4397.Reif, *Ber.*, 1908, **41**, 2745.**5-Methyl-1 : 5-heptadienol-4** (3-Methyl-2 : 6-heptadienol-4, allylisobutenylcarbinol)Liq. with odour resembling menthol. B.p. 172–3°. decomp., 78–9°/19 mm. D_4^{25} 0.8766. n_D^{19} 1.4648. Absorbs atmospheric oxygen.Enklaar, *Rec. trav. chim.*, 1916, **36**, 224.**4-Methyl-1 : 6-heptadienol-4.**

See Methylallylcarbinol.

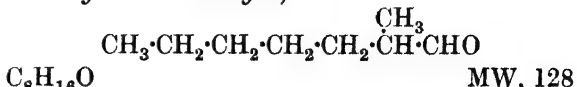
2-Methyl-2 : 4-heptadienone-6 (4-Methyl-1-acetopentadiene-1 : 3)B.p. 83.5°/9 mm. D_4^{20} 0.8980. n_D^{20} 1.5306. Absorbs atmospheric oxygen. AcOH + H₂SO₄ → red sol. finally turning deep blue.

Semicarbazone : needles from MeOH. M.p. 192° decomp.

Fischer, Löwenberg, *Ann.*, 1932, **494**, 279.**3-Methyl-2 : 4-heptadienone-6** (3-Methyl-1-acetopentadiene-1 : 3)

B.p. 92–3°/12 mm. Decomp. on dist. at atm. press. Resinifies on standing.

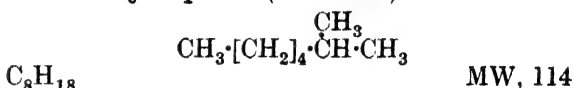
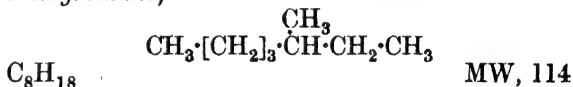
Oxime : cryst. from pet. ether. M.p. 71°. B.p. 140–1°/13 mm.

Dautwitz, *Monatsh.*, 1906, **27**, 773.**1-Methylheptaldehyde** (2-Methylheptanal, 1-methylœnanthaldehyde)

B.p. 159–61°/725 mm.

Fourneau, Benoit, Firmenich, *Bull. soc. chim.*, 1930, **47**, 869.**2-Methylheptandione-5 : 6.**

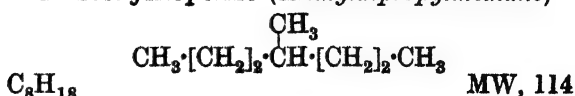
See Acetylisocaproyl.

2-Methylheptane (Iso-octane)Occurs in petroleum. F.p. –111.3°. B.p. 117.2° (116–18°), 107°/747 mm. D_{15}^{15} 0.7035, D_4^{25} 0.7025. n_D^{20} 1.3981 (1.3949). Heat of comb. C_v 1305 Cal.Clarke, *J. Am. Chem. Soc.*, 1911, **33**, 520; 1909, **31**, 113, 115.Washburn, *Chem. Abstracts*, 1934, **28**, 3878.Buelens, *Chem. Zentr.*, 1909, **I**, 832.Leslie, *Bureau of Standards Journal of Research*, 1933, **10**, 609.Fischer, Treibs, *Ann.*, 1925, **446**, 257.Brown, Carr, *Ind. Eng. Chem.*, 1926, **18**, 718.**3-Methylheptane** (Methylethylbutylmethane, 2-ethylhexane)

d-.

B.p. 110–20°. D^{18} 0.7075, D^{24} 0.680. $[\alpha]_D^{16}$ + 8.40°.

dl-.

B.p. 120–22°. D_{15}^{15} 0.7167, D_4^{20} 0.7069. n_D^{20} 1.398, n_D^{25} 1.4022.Clarke, *J. Am. Chem. Soc.*, 1909, **31**, 558.Guye, *Bull. soc. chim.*, 1901, **25**, 550.Levene, Taylor, *J. Biol. Chem.*, 1922, **54**, 355.**4-Methylheptane** (Methyldipropylmethane)B.p. 118°. D^{15} 0.7217. n_D^{25} 1.3978.Clarke, *Ber.*, 1907, **40**, 354.

2-Methylheptane-4-carboxylic Acid.

See 1-Propylisocaproic Acid.

3-Methylheptane-5-carboxylic Acid.

See 3-Methyl-1-ethylcaproic Acid.

4-Methylheptane-4-carboxylic Acid.See 1-Methyl-1-propyl-*n*-valeric Acid.**2-Methylheptane-1:1-dicarboxylic Acid.**See 1-Methyl-*n*-hexylmalonic Acid.**2-Methylheptane-1:4-dicarboxylic Acid.**

See 3-Methyl-1-propyladipic Acid.

2-Methylheptane-1:7-dicarboxylic Acid.

See 2-Methylazelaic Acid.

2-Methylheptane-3:4-dicarboxylic Acid.

See 1-Propyl-2-isopropylsuccinic Acid.

2-Methylheptane-3:6-dicarboxylic Acid.

See 1-Methyl-4-isopropyladipic Acid.

2-Methylheptane-4:4-dicarboxylic Acid.

See Propylisobutylmalonic Acid.

2-Methylheptane-4:6-dicarboxylic Acid.

See 1-Methyl-3-isobutylglutaric Acid.

2-Methylheptane-5:6-dicarboxylic Acid.

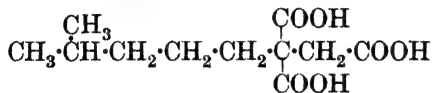
See 1-Methyl-2-isoamylsuccinic Acid.

2-Methylheptane-6:7-dicarboxylic Acid.

See Isohexylsuccinic Acid.

3-Methylheptane-2:6-dicarboxylic Acid.

See 1:2:5-Trimethylpimelic Acid.

2-Methylheptane-6:6:7-tricarboxylic Acid $\text{C}_{11}\text{H}_{18}\text{O}_6$ MW, 246Cryst. from Et_2O -ligroin. M.p. 141° . Sol. H_2O , EtOH , Et_2O . Spar. sol. CHCl_3 . Insol. ligroin. Heat at $160^\circ \rightarrow$ isohexylsuccinic acid.Tri-Et ester: $\text{C}_{17}\text{H}_{30}\text{O}_6$. MW, 330. B.p. $172^\circ/9$ mm. D_4^{20} 1.0127. n_D^{20} 1.4370.Longinow, *J. Russ. Phys.-Chem. Soc.*, 1915, 47, 1137.**Methylheptanol-1.**See Methyl-*n*-heptyl Alcohol.**2-Methylheptanol-2 (Dimethyl-*n*-amylcarbinol)**

$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3\text{-[CH}_2\text{]}_4\text{-C(OH)-CH}_3 \end{array}$$
 $\text{C}_8\text{H}_{18}\text{O}$ MW, 130
B.p. 162° , 66–8°/15 mm. D_4^{25} 0.8136. n_D 1.4301.Muset, *Chem. Zentr.*, 1907, I, 1313.Whitmore, Williams, *J. Am. Chem. Soc.*, 1933, 55, 408.**2-Methylheptanol-3.**

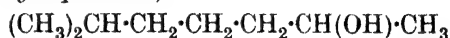
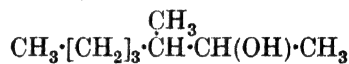
See Isopropylbutylcarbinol.

2-Methylheptanol-4.

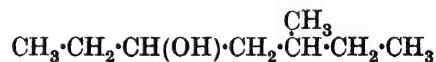
See Propylisobutylcarbinol.

2-Methylheptanol-5.

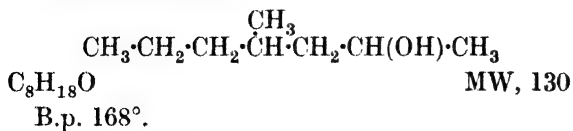
See Ethylisoamylcarbinol.

2-Methylheptanol-6 (Methylisohexylcarbinol, 6-methylheptanol-2) $\text{C}_8\text{H}_{18}\text{O}$ MW, 130B.p. 176° . D_4^{20} 0.8128. n_D 1.4238.Acetyl: b.p. $187\text{--}8^\circ/768$ mm. D_4^{20} 0.8494. n_D 1.4137.Methyl ether: $\text{C}_9\text{H}_{20}\text{O}$. MW, 144. B.p. $149\text{--}50^\circ$. D_4^{20} 0.7945.Clarke, *J. Am. Chem. Soc.*, 1909, 31, 111.Buelens, *Chem. Zentr.*, 1909, I, 832.**3-Methylheptanol-2** $\text{C}_8\text{H}_{18}\text{O}$ MW, 130B.p. $172\text{--}3^\circ$. D_4^{13} 0.8272. n_D^{13} 1.436.Acetyl: b.p. 185° . D_4^{21} 0.8545. n_D^{21} 1.418. Fragrant odour. Used in perfumery.Powell, *J. Am. Chem. Soc.*, 1924, 46, 2517.**3-Methylheptanol-3.**

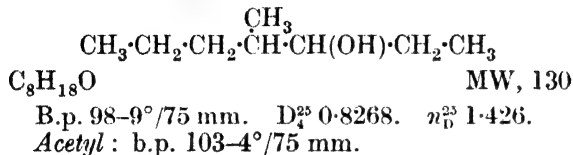
See Methyl-ethylbutylcarbinol.

3-Methylheptanol-4.See Propyl-sec.-*n*-butylcarbinol.**3-Methylheptanol-5 (Ethyl-active-amylcarbinol, 5-methylheptanol-3)** $\text{C}_8\text{H}_{18}\text{O}$ MW, 130Liq. with odour of peppermint. B.p. $167\text{--}8^\circ$ (155°). D_4^0 0.85, D_4^{25} 0.8425. n_D^{25} 1.433.Powell, Secoy, *J. Am. Chem. Soc.*, 1931, 53, 767.Guerbet, *Compt. rend.*, 1910, 150, 183.**3-Methylheptanol-6 (5-Methylheptanol-2)** $\text{C}_8\text{H}_{18}\text{O}$ MW, 130B.p. $167\text{--}9^\circ$. D_4^{21} 0.8174. $[\alpha]_D^{25} + 4.69^\circ$.Welt, *Ann. chim.*, 1895, 6, 135.

4-Methylheptanol-2

Clarke, *Ber.*, 1907, 40, 354.

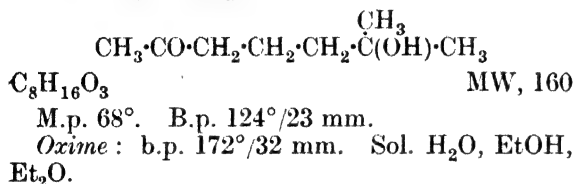
4-Methylheptanol-3

Bjelouss, *Ber.*, 1912, 45, 628.

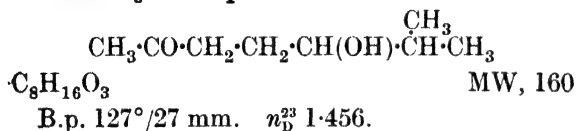
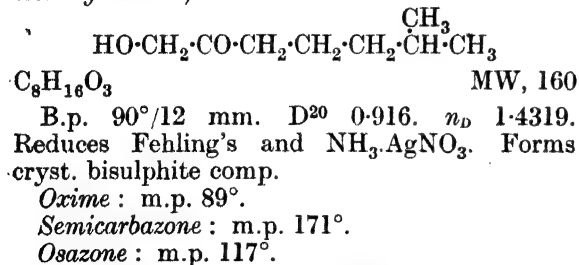
4-Methylheptanol-4.

See Methylpropylcarbinol.

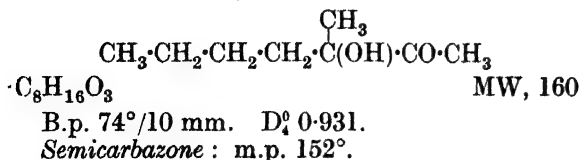
2-Methyl-2-heptanolone-6

Verley, *Bull. soc. chim.*, 1897, 17, 186.

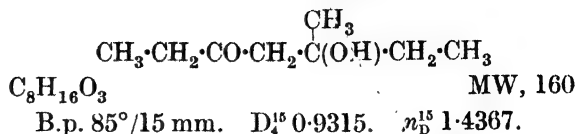
2-Methyl-3-heptanolone-6

Verley, *Bull. soc. chim.*, 1897, 17, 190.2-Methyl-7-heptanolone-6 (*Hydroxymethyl isohexyl ketone*)Wallach, *Ann.*, 1915, 408, 192.

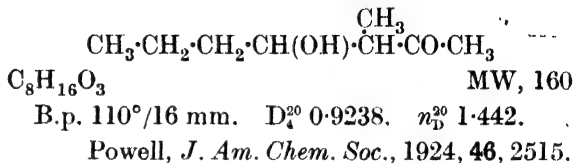
3-Methyl-3-heptanolone-2

Leers, *Bull. soc. chim.*, 1926, 39, 424.

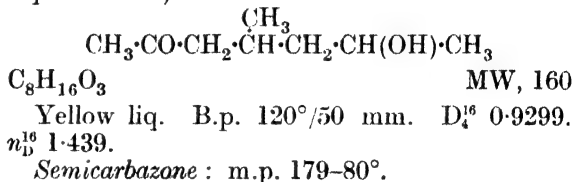
3-Methyl-3-heptanolone-5

Grignard, Fluchaire, *Ann. chim.*, 1928, 9, 28.

3-Methyl-4-heptanolone-2



4-Methyl-2-heptanolone-6 (4-Methyl-6-heptanolone-2)

*Semicarbazone*: m.p. 179–80°.Prileschajew, *Ber.*, 1926, 59, 197.

2-Methylheptanone-3.

See Isopropyl butyl Ketone.

2-Methylheptanone-4.

See Propyl isobutyl Ketone.

2-Methylheptanone-5.

See Ethyl isoamyl Ketone.

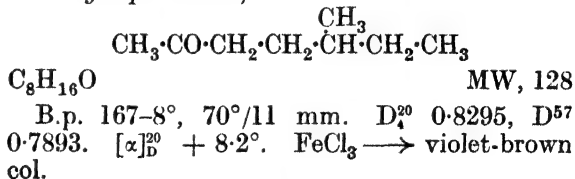
2-Methylheptanone-6.

See Isoamylacetone.

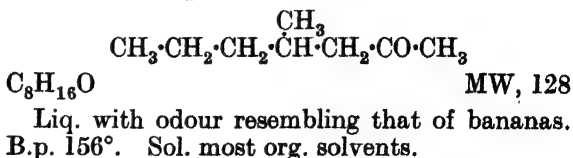
3-Methylheptanone-5.

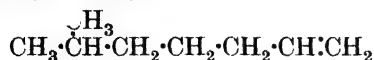
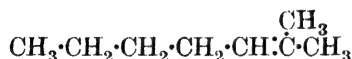
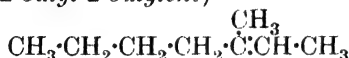
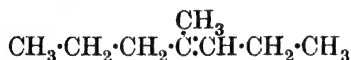
See Ethyl active-amyl Ketone.

3-Methylheptanone-6 (active-Amylacetone, 5-methylheptanone-2)

Rupe, Wild, *Ann.*, 1918, 414, 117.Welt, *Ann. chim.*, 1895, 6, 134.

4-Methylheptanone-2

Clarke, *Ber.*, 1907, 40, 353.

6-Methyl-1-heptene (α -Iso-octene)C₈H₁₆ MW, 112B.p. 122-4° (113-15°). D₄²⁰ 0.7125. n_D²⁰ 1.3986.de Rességuier, *Bull. soc. chim.*, 1914, **15**, 183.Brooks, Humphrey, *J. Am. Chem. Soc.*, 1918, **40**, 838.**2-Methyl-2-heptene** (1 : 1-Dimethyl-2-butyl-ethylene)C₈H₁₆ MW, 112B.p. 123-5°, 117-19°/740 mm. D²⁰ 0.816. n_D²⁰ 1.4138.Muset, *Chem. Zentr.*, 1907, **I**, 1313.Church, Whitmore, McGrew, *J. Am. Chem. Soc.*, 1934, **56**, 180.**3-Methyl-2-heptene** (1 : 2-Dimethyl-2-butyl-ethylene, 2-butyl-2-butylene)C₈H₁₆ MW, 112B.p. 121°. D₂₀²⁰ 0.7296. n_D²⁰ 1.4183.Tuot, *Compt. rend.*, 1933, **197**, 1434.**4-Methyl-3-heptene** (1-Methyl-2-ethyl-1-propylethylene, 2-propyl-2-pentene)C₈H₁₆ MW, 112B.p. 120.4°. D₀²⁰ 0.73138, D₄²⁵ 0.7411. n_D²⁵ 1.41712. CrO₃ → acetic and propionic acids.Sokoloff, *J. prakt. Chem.*, 1889, **39**, 444.Bjelouss, *Ber.*, 1912, **45**, 629.**6-Methyl-1-heptene-4 : 7-dicarboxylic Acid.**

See 3-Methyl-1-allyladipic Acid.

6-Methyl-2-heptene-2 : 3-dicarboxylic Acid.

See Methylisoamylmaleic Acid.

6-Methyl-3-heptene-1 : 3-dicarboxylic Acid (1-Isoamylideneglutaric acid)C₁₀H₁₆O₄ MW, 200

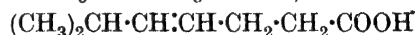
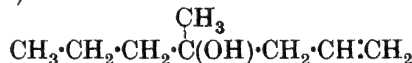
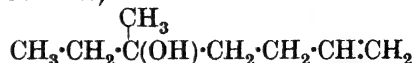
Diet. of Org. Comp.—II.

Leaflets from H₂O. M.p. 75°. Sol. Et₂O, CHCl₃, warm ligroin, warm CS₂. Spar. sol. cold H₂O.Dibromide : cryst. from CHCl₃-ligroin. M.p. 148°.Fittig, Bronnert, *Ann.*, 1894, **282**, 344.**2-Methylheptene-2-dione-4 : 6.**

See Acetylmesityl oxide.

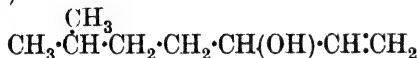
5-Methyl-1-heptenic Acid (2-Isoamylacrylic acid, 1-iso-octenic acid)C₈H₁₄O₂ MW, 142M.p. 3°. B.p. 239-40°, 122-3°/12 mm. D²⁰ 0.938. n_D 1.4511. Very spar. sol. H₂O. Volatile in steam.Amide : C₈H₁₅ON. MW, 141. M.p. 153°.

Dibromide : m.p. 58-9°.

Wallach, *Ann.*, 1915, **408**, 196.Fittig, Weil, *Ann.*, 1894, **283**, 283.**5-Methyl-2-heptenic Acid** (2-Iso-octenic acid, 2-isoamylidenepropionic acid)C₈H₁₄O₂ MW, 142B.p. 232°. Insol. H₂O. Volatile in steam.Fittig, Weil, *Ann.*, 1894, **283**, 279.**5-Methyl-3-heptenic Acid** (3-Iso-octenic acid, 3-isobutylidenebutiric acid)C₈H₁₄O₂ MW, 142B.p. 231-3°. Insol. H₂O.Fromm, Lischke, *Ber.*, 1900, **33**, 1203.**4-Methyl-1-heptenol-4** (Methylpropylallyl-carbinol)C₈H₁₆O MW, 128Liq. with camphor-like odour. B.p. 159-60°. D₀²⁰ 0.8345. Heat of comb. C_p 1214 Cal.Semljanitzin, *J. prakt. Chem.*, 1881, **23**, 263.**5-Methyl-1-heptenol-5** (Methylethyl- γ -butenylcarbinol)C₈H₁₆O MW, 128

B.p. 65°/14 mm.

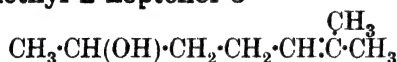
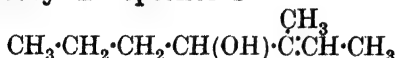
Sand, Singer, *Ann.*, 1903, **329**, 176.

5-Methyl-1-heptenol-7 (3- γ -Butenyl-n-butyl alcohol)C₈H₁₆O MW, 128B.p. 97–9°/22 mm. D₄¹⁹ 0.8562. n_D¹⁹ 1.4470.v. Braun, Gossel, *Ber.*, 1924, **57**, 378.**6-Methyl-1-heptenol-3** (Vinylisoamylcarbinol)C₈H₁₆O MW, 128B.p. 88–91°/12 mm. (73–4°/16 mm.). D₄²⁰ 0.84.

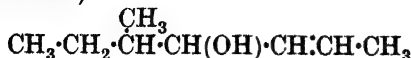
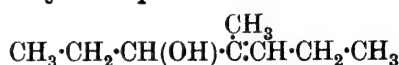
Acetyl: b.p. 83–4°/18 mm.

Burton, *J. Chem. Soc.*, 1930, 251.Delaby, Guillot-Allègre, *Bull. soc. chim.*, 1933, **53**, 307.**6-Methyl-1-heptenol-4.**

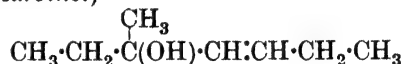
See Isobutylallylcarbinol.

2-Methyl-2-heptenol-6C₈H₁₆O MW, 128l.
Occurs in linaloe oil. B.p. 178–80°, 58–9°/3 mm. D₁₅¹⁵ 0.8579. n_D²⁰ 1.4495. [α]_D – 11° 34' dl.B.p. 174–6°, 83–6°/15 mm., 74–5°/10 mm. D₂₀²⁰ 0.8545. n_D²⁰ 1.4505.Acetyl: b.p. 78°/9 mm. D₄¹⁸ 0.8928. n_D¹⁸ 1.4328.Me ether: C₈H₁₈O. MW, 142. B.p. 163–4°, 60°/15 mm., 50°/9 mm. D₄¹⁸ 0.8103. n_D¹⁸ 1.4281.Helferich, *Ber.*, 1919, **52**, 1805.Schimmel, *Chem. Zentr.*, 1909, **I**, 22.Wallach, *Ann.*, 1893, **275**, 171.**3-Methyl-2-heptenol-4**C₈H₁₆O MW, 128B.p. 74–7°/17 mm. D₁₀¹⁰ 0.8722. n_D¹⁰ 1.45614.

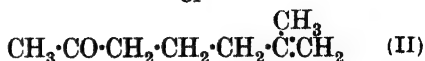
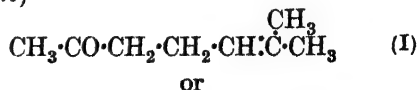
Acetyl: b.p. 79–83°/16 mm.

Abelmann, *Ber.*, 1910, **43**, 1581.**5-Methyl-2-heptenol-4** (sec.-n-Butylpropenylcarbinol)C₈H₁₆O MW, 128B.p. 69–70°/18 mm. D₄²⁰ 0.8473. n_D²⁰ 1.4411.Hess, Wustrow, *Ann.*, 1924, **437**, 262.**6-Methyl-2-heptenol-4** (Isobutylpropenylcarbinol)C₈H₁₆O MW, 128B.p. 67°/11 mm. D₄¹⁸ 0.8354. n_D¹⁸ 1.4392.Auwers, Westermann, *Ber.*, 1921, **54**, 2996.**2-Methyl-3-heptenol-2**C₈H₁₆O MW, 128B.p. 62–3°/14 mm. D₄¹⁸ 0.8398. n_D¹⁸ 1.4416.Grignard, Dubien, *Ann. chim.*, 1924, **2**, 294.**4-Methyl-3-heptenol-5**C₈H₁₆O MW, 128B.p. 66°/17 mm. D₄¹⁸ 0.8525. n_D¹⁸ 1.4479.

Acetyl: b.p. 113°/80 mm.

Auwers, Westermann, *Ber.*, 1921, **54**, 2996.**5-Methyl-3-heptenol-5** (Methylethyl- α -butenylcarbinol)C₈H₁₆O MW, 128B.p. 103°/75 mm., 62°/15 mm. D₄¹⁷ 0.8477. n_D²⁰ 1.4465.Pastureau, Zamenhof, *Bull. soc. chim.*, 1926, **39**, 1435.Grignard, Fluchaire, *Ann. chim.*, 1928, **9**, 40.**2-Methyl-1-heptenone-6.**

See under 2-Methyl-2-heptenone-6.

2-Methyl-2-heptenone-6 (6-Keto-2-methylheptene-2, 2-methyl-1-heptenone-6, natural methylheptenone)C₈H₁₄O MW, 126Present in Ceylon citronella oil, lemon-grass oil, and palmarosa oil. B.p. 172–4°, 108.3°/20 mm., 84°/56 mm., 58.6°/10 mm. n_D²⁰ 1.4445. The methylheptenone from lemon-grass oil or

obtained from citral by treatment with alkali consists of approx. 80% (I) and 20% (II).

Oxime : b.p. 120°/25 mm., 116°/15 mm. D_4^{14} 0.919. n_D^{20} 1.475. *Acetyl* : b.p. 140°/30 mm.

Semicarbazone : m.p. about 135°.

p-Nitrophenylhydrazone : m.p. 103.5–104°.

Verley, *Bull. soc. chim.*, 1924, **35**, 608, 1653.

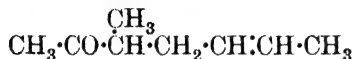
Harries, *Ber.*, 1902, **35**, 1179.

Tiemann, Semmler, *Ber.*, 1895, **28**, 2126.

3-Methyl-2-heptenone-5.

See under Homomesitones.

5-Methyl-2-heptenone-6

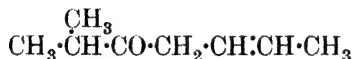


$\text{C}_8\text{H}_{14}\text{O}$ MW, 126

Liq. with odour resembling amyl acetate. B.p. 62–4°/20 mm. D_4^{18} 0.8463. n_D^{18} 1.4345.

v. Braun, Gossel, *Ber.*, 1924, **57**, 377.

6-Methyl-2-heptenone-5



$\text{C}_8\text{H}_{14}\text{O}$ MW, 126

B.p. 161–2°. D_4^{20} 0.842. n_D^{20} 1.43096. Ox. —→ oxalic and isobutyric acids.

Oxime : b.p. 99°/12 mm.

Semicarbazone : cryst. from MeOH. M.p. 93–5°.

Wallach, *Ann.*, 1901, **319**, 112.

2-Methyl-3-heptenone-5



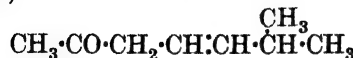
$\text{C}_8\text{H}_{14}\text{O}$ MW, 126

Liq. with ester-like odour. B.p. 167°/772 mm., 62–5°/23 mm., 53–6°/15 mm.

Semicarbazone : cryst. from MeOH. M.p. 174–5°.

Thoms, Kahre, *Chem. Zentr.*, 1925, **II**, 547.

2-Methyl-3-heptenone-6 (β -Isomethylheptenone)



$\text{C}_8\text{H}_{14}\text{O}$ MW, 126

B.p. 163°. D_4^{20} 0.8345. n_D^{20} 1.4315.

Oxime : b.p. 122°/28 mm., 108–10°/15 mm.

Semicarbazone : cryst. from EtOH. M.p. 115°.

Tiemann, Krüger, *Ber.*, 1895, **28**, 2122.

3-Methyl-3-heptenone-2



$\text{C}_8\text{H}_{14}\text{O}$ MW, 126

B.p. 170–6°, 68–9°/15 mm. D_4^{10} 0.8613. n_D^{10} 1.451.

Oxime : b.p. 119–20°/20 mm.

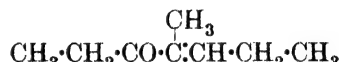
Semicarbazone : cryst. from EtOH. M.p. 164°.

Powell, *J. Am. Chem. Soc.*, 1924, **46**, 2515.

3-Methyl-3-heptenone-5.

See under Homomesitones.

4-Methyl-3-heptenone-5



$\text{C}_8\text{H}_{14}\text{O}$ MW, 126

B.p. 170–2°/735 mm., 96–8°/70 mm. D_4^{18} 0.8773. n_D^{18} 1.4510.

Semicarbazone : m.p. 167°.

2 : 4-Dinitrophenylhydrazone : m.p. 147°.

Courtot, Pierron, *Bull. soc. chim.*, 1929, **45**, 291.

6-Methyl-3-heptenone-2 (Isoamylideneacetone, α -isomethylheptenone)



$\text{C}_8\text{H}_{14}\text{O}$ MW, 126

Liq. with odour resembling amyl acetate. B.p. 178–80°, 65°/10 mm. D_4^{17} 0.8443. n_D^{17} 1.44275.

Semicarbazone : (a) m.p. 100°. (b) M.p. 118–20°.

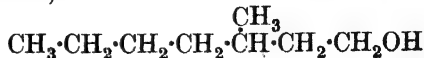
Semicarbazide-semicarbazone : cryst. from EtOH. M.p. 157°.

Tiemann, Tigges, *Ber.*, 1900, **33**, 561.

Pastureau, Zamenhof, *Compt. rend.*, 1926, **182**, 323.

Locquin, Heilmann, *Bull. soc. chim.*, 1929, **45**, 1131.

3-Methyl-*n*-heptyl Alcohol (3-Methylheptanol-1)



$\text{C}_8\text{H}_{18}\text{O}$ MW, 130

l.

B.p. 99°. D_4^{24} 0.824. n_D^{25} 1.4295. $[\alpha]_D^{25}$ –2.75°.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 93.

4-Methyl-*n*-heptyl Alcohol (4-Methylheptanol-1)

$\text{CH}_3\text{CH}_2\text{CH}_2\overset{\text{CH}_3}{\underset{|}{\text{CH}}}\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
 $\text{C}_8\text{H}_{18}\text{O}$ MW, 130
 B.p. 188–93°, 81°/18 mm.

Levene, Marker, *J. Biol. Chem.*, 1933, **103**, 303.

Koller, Kandler, *Monatsh.*, 1931, **58**, 230.

5-Methyl-*n*-heptyl Alcohol (5-Methylheptanol-1)

$\text{CH}_3\text{CH}_2\overset{\text{CH}_3}{\underset{|}{\text{CH}}}\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
 $\text{C}_8\text{H}_{18}\text{O}$ MW, 130
 d-.
 B.p. 87°/20 mm. $[\alpha]_D^{24} + 2.99^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1933, **103**, 305.

6-Methyl-*n*-heptyl Alcohol (6-Methylheptanol-1, iso-octyl alcohol)

$(\text{CH}_3)_2\text{CHCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
 $\text{C}_8\text{H}_{18}\text{O}$ MW, 130
 B.p. 188.5°. $D_4^{25} 0.8230$.
Phenylurethane: m.p. 81–81.4°.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 452.

***N*-Methylheptylamine**

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{NHCH}_3$
 $\text{C}_8\text{H}_{19}\text{N}$ MW, 129
 B.p. 168°. Spar. sol. H_2O . Volatile in steam.

$\text{B}_2\text{H}_2\text{PtCl}_6$: orange leaflets from H_2O . M.p. 168°.

Picrate: yellow needles from EtOH–Et₂O. M.p. 97°.

Braun, *Ann.*, 1911, **382**, 26.

3-Methylheptylamine

$\text{CH}_3\text{CH}_2\overset{\text{CH}_3}{\underset{|}{\text{CH}}}\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
 $\text{C}_8\text{H}_{19}\text{N}$ MW, 129
 l-.
 B.p. 87°/47 mm. $D_4^{24} 0.782$. $n_D^{25} 1.4288$.
 $[\alpha]_D^{24} - 1.34^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 95.

Methylheptylcarbinol (Nonanol-2)

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
 $\text{C}_9\text{H}_{20}\text{O}$ MW, 144

d-.

B.p. 105°/19 mm. $D_4^{20} 0.8230$. $n_D^{20} 1.4299$.
 $[\alpha]_D^{19} + 8.98^\circ$. $[\alpha]_D^{20} + 11.90^\circ$ in C_6H_6 .

dl-.

F.p. –35°. B.p. 193–4°, 91°/12 mm. $D^{20} 0.84708$. $n 1.43533$. Hot 60% $\text{H}_2\text{SO}_4 \rightarrow$ 2-nonene.

Me ether: $\text{C}_{10}\text{H}_{22}\text{O}$. MW, 158. B.p. 188–9°. $D^{20} 0.8228$. Insol. H_2O .

Et ether: $\text{C}_{11}\text{H}_{24}\text{O}$. MW, 172. B.p. about 200°. $D^{20} 0.8193$. $n 1.423$.

1-Naphthylurethane: m.p. 55.5°.

3:5-Dinitrobenzoyl: m.p. 42.8°.

van Gysegem, *Chem. Zentr.*, 1907, I, 530.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 56, 70.

Methyl heptyl Ether

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OCH}_3$
 $\text{C}_8\text{H}_{18}\text{O}$ MW, 130
 B.p. 149.8°. $D_4^0 0.7953$.

Dobriner, *Ann.*, 1888, **243**, 3.

1-Methyl-*n*-heptylic Acid (1-Methylænanthylic acid, methylamylacetic acid, 1-amylpropionic acid)

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\overset{\text{CH}_3}{\underset{|}{\text{CH}}}\text{COOH}$
 $\text{C}_8\text{H}_{16}\text{O}_2$ MW, 144
 B.p. 121–2°/13 mm.
Chloride: $\text{C}_8\text{H}_{15}\text{OCl}$. MW, 162.5. B.p. 179.5–182°/727 mm.

Karrer, Shibata, Wettstein, Jacubowicz, *Helv. Chim. Acta*, 1930, **13**, 1297.

3-Methyl-*n*-heptylic Acid (3-Propylvaleric acid, 3-methylænanthylic acid)

$\text{CH}_3\text{CH}_2\overset{\text{CH}_3}{\underset{|}{\text{CH}}}\text{CH}_2\text{CH}_2\text{COOH}$
 $\text{C}_8\text{H}_{16}\text{O}_2$ MW, 144

d-.

B.p. 132°/22 mm. $D_4^{24} 0.882$. $[\alpha]_D^{24} + 2.11^\circ$.
Et ester: $\text{C}_{10}\text{H}_{20}\text{O}_2$. MW, 172. B.p. 104°/32 mm. $D_4^{24} 0.859$. $[\alpha]_D^{24} + 1.41^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 14.

4-Methyl-*n*-heptylic Acid (4-Ethylcaproic acid, 4-methylænanthylic acid)

$\text{CH}_3\text{CH}_2\overset{\text{CH}_3}{\underset{|}{\text{CH}}}\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$
 $\text{C}_8\text{H}_{16}\text{O}_2$ MW, 144

d-.

B.p. 128°/20 mm. $D_4^{26} 0.893$. $[\alpha]_D^{26} + 2.47^\circ$.

Et ester: $C_{10}H_{20}O_2$. MW, 172. B.p. $95^\circ/25$ mm. D_4^{25} 0.865. $[\alpha]_D^{25} + 2.43^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1932, 95, 162; 1933, 103, 304.

5-Methyl-*n*-heptylic Acid (*Isohexylacetic acid*, *2-isoamylpropionic acid*, *3-isobutylbutyric acid*, *4-isopropylvaleric acid*, *5-methylænanthylic acid*)



$C_8H_{16}O_2$ MW, 144

Solidifies at 0° . B.p. $232^\circ/762$ mm., $126-7^\circ/14$ mm.

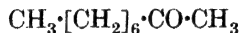
Et ester: $C_{10}H_{20}O_2$. MW, 172. B.p. $200-3^\circ$.

Amide: $C_8H_{17}ON$. MW, 143. Plates. M.p. 114° .

Nitrile: $C_8H_{15}N$. MW, 125. B.p. 194° .

Levene, Allen, *J. Biol. Chem.*, 1916, 27, 452.

Methyl heptyl Ketone (*Nonanone - 2*, *2-ketononane*)



$C_9H_{18}O$ MW, 142

Present in attar of rose and in small amount in oil of cloves. F.p. -15° . B.p. $194-6^\circ$, $96-102^\circ/24$ mm., $80-2^\circ/15$ mm., $75-7^\circ/12$ mm. D_4^{22} 0.8188. n_D^{22} 1.4175. Ox. \rightarrow acetic and *n*-heptylic acids.

Oxime: m.p. 16° . B.p. $131^\circ/15$ mm. D_4^{20} 0.88409. n_D^{20} yellow 1.45513.

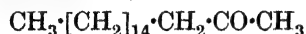
Semicarbazone: m.p. $119-20^\circ$.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, 44, 108T.

2-Methyl-1-heptylyloctane.

See 7-Methylpentadecanone-9.

Methyl hexadecyl Ketone (*2-Keto-octadecane*, *octadecanone-2*)



$C_{18}H_{36}O$ MW, 268

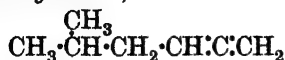
M.p. 52° . B.p. $251-2^\circ/100$ mm. Ox. \rightarrow acetic and palmitic acids.

Semicarbazone: m.p. $114-16^\circ$.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, 44, 108T.

Krafft, *Ber.*, 1882, 15, 1707.

5-Methyl-1 : 2-hexadiene (*Isoamylidene-ethylene*, *isobutylallene*)



C_7H_{12} MW, 96

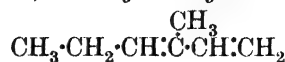
B.p. 96° . D_4^{19} 0.7225. n_D^{19} 1.4282.

Bouis, *Ann. chim.*, 1928, 9, 443.

1-Methyl-1 : 3-hexadiene.

See 2 : 4-Heptadiene.

3-Methyl-1 : 3-hexadiene (*1-Methyl-2-ethyl-1-vinylethylene*, *2-methyl-1-ethylbutadiene-1 : 3*)

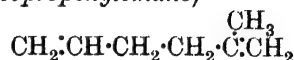


C_7H_{12} MW, 96

B.p. $101-3^\circ$. D_4^{25} 0.7407. n_D^{25} 1.45247.

Bjelouss, *Ber.*, 1912, 45, 626.

2-Methyl-1 : 5-hexadiene (*2-Methyldiallyl*, *sym.-vinylisopropenylethane*)



C_7H_{12} MW, 96

B.p. $92.5^\circ/769$ mm. $D_4^{18.5}$ 0.7289. $n_D^{17.3}$ 1.42376.

Nitrosochloride: needles from MeOH.Aq. M.p. $75-6^\circ$.

Auwers, Moosbrugger, *Ann.*, 1912, 387, 181.

2-Methyl-2 : 4-hexadiene (*2-Methyldipropenyl*, *sym.-ethylideneisopropylidene-ethane*, *1 : 1 : 4-trimethylbutadiene-1 : 3*)

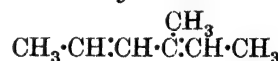


C_7H_{12} MW, 96

B.p. $97-9^\circ$. D_4^0 0.7387, $D_4^{24.5}$ 0.7192. $n_D^{24.5}$ 1.4266.

Reif, *Ber.*, 1908, 41, 2745.

3-Methyl-2 : 4-hexadiene (*3-Methyldipropenyl*, *1 : 2 : 4-trimethylbutadiene-1 : 3*)



C_7H_{12} MW, 96

B.p. $107-8^\circ$. D_4^0 0.7753, D_4^{15} 0.7625. n_D^{15} 1.46146.

Abelmann, *Ber.*, 1910, 43, 1584.

Methylhexahydroacetophenone.

See Methylacetocyclohexane.

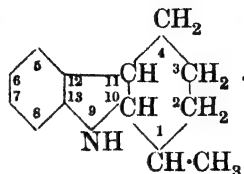
Methylhexahydrobenzaldehyde.

See Hexahydrotoluic Aldehyde.

Methylhexahydrobenzoic Acid.

See Hexahydrotoluic Acid.

1-Methylhexahydrocarbazole (*1-Methyl-carbazoline*)



$C_{13}H_{17}N$

MW, 187

B, HCl: needles from EtOH. M.p. 268°.

Plancher, Cecchetti, Ghigi, *Gazz. chim. ital.*, 1929, **59**, 344.

2-Methylhexahydrocarbazole.

Prisms from EtOH.Aq. M.p. 111° (102–3°).

B, HBr: m.p. 230–1°.

B, HI: m.p. 227–9°.

N-Benzoyl: prisms from EtOH.Aq. M.p. 89°.

N-Carbamyl: cryst. M.p. 153–4°.

N-Nitroso: needles. M.p. 62°.

Borsche, *Ann.*, 1908, **359**, 71.

3-Methylhexahydrocarbazole.

Exists in two forms.

(i) Prisms from EtOH. M.p. 58·5°.

(ii) Needles from EtOH. M.p. 128°.

N-Acetyl: prisms from EtOH. M.p. 101°.

N-Benzoyl: needles from EtOH. M.p. 81·5°.

Picrate: yellow prisms from toluene. M.p. 115–16°.

Plant, Rosser, *J. Chem. Soc.*, 1928, 2460.

6-Methylhexahydrocarbazole.

Prisms. M.p. 43–4°. B.p. 230–40°/14 mm.

N-Nitroso: brownish-yellow prisms from Et₂O.

M.p. 71°.

Picrate: cryst. M.p. 174° decomp.

Manjunath, *Quart. J. Indian Chem. Soc.*, 1927, **4**, 281.

9-Methylhexahydrocarbazole (N-Methylcarbazoline).

B.p. 294–5°/748 mm., 162°/24 mm., 144°/15 mm. *D*₄¹⁹ 1·035. *n*_D¹⁹ 1·6248.

Picrate: yellow plates. M.p. 143–4° decomp.

Picrolonate: yellow needles from EtOH. M.p. 174–5°.

Methiodide: cryst. from MeOH. M.p. 194–5° decomp. Sol. hot H₂O, MeOH, EtOH. Spar. sol. Et₂O.

Schmidt, Sigwart, *Ber.*, 1912, **45**, 1784.

Perkin, Plant, *J. Chem. Soc.*, 1924, **125**, 1512.

11-Methylhexahydrocarbazole.

B.p. about 158–62°/13 mm.

B, HCl: needles from EtOH. M.p. 220°.

B, HBr: cryst. M.p. 228°.

B, HI: cryst. from EtOH. M.p. 196–7°.

Picrate: yellow cryst. from C₆H₆. M.p. about 161°. Sol. EtOH.

Plancher, Testoni, *Atti accad. Lincei*, 1901, **10**, i, 306.

Plancher, Cecchetti, Ghigi, *Gazz. chim. ital.*, 1929, **59**, 344.

Methylhexahydrocatechol.

See Methylcyclohexandiol-1 : 2.

N-Methylhexahydrodipicolinic Acid.

See Scopolinic Acid.

Methyl hexahydrostyryl Ketone.

See Hexahydrobenzylideneacetone.

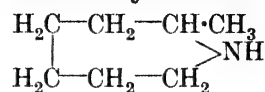
Methyl hexahydrotolyl Ketone.

See Methylacetocyclohexane.

Methylhexalin.

See Methylcyclohexanol.

2-Methylhexamethyleneimine



C₇H₁₅N

MW, 113

Oil. B.p. 148–50°. *D*₂₀ 0·8590. *n*_D 1·45862.

Sol. H₂O with strong alk. reaction.

B, HCl: m.p. 196°.

N-Nitroso: oil. B.p. 240–2°/746 mm.

N-Benzoyl: b.p. 185–7°/13 mm.

N-Benzenesulphonyl: cryst. from 96% EtOH. M.p. 78°.

B, H₂AuCl₄: m.p. 95°.

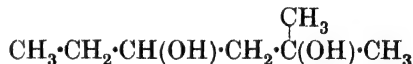
Platinichloride: needles from 96% EtOH. M.p. 196°.

Picrate: needles. M.p. 131°.

Müller, Krauss, *Monatsh.*, 1932, **61**, 215.

Gabriel, *Ber.*, 1909, **42**, 1263.

2-Methylhexandiol-2 : 4 (1 : 1-Dimethyl-3-ethyltrimethylene glycol, 3-methyl-1-ethyl-β-butylene glycol)



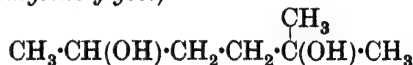
C₇H₁₆O₂

MW, 132

B.p. 121°/30 mm. *D*₁₈ 0·9321. *n*_D¹⁸ 1·4407.

Pastureau, Zamenhof, *Bull. soc. chim.*, 1926, **39**, 1430.

2-Methylhexandiol-2 : 5 (1 : 1 : 4-Trimethyl-tetramethylene glycol)



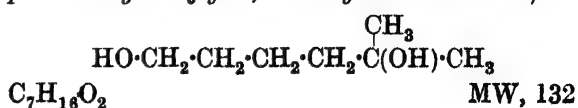
C₇H₁₆O₂

MW, 132

Syrup. B.p. 121°/14 mm. Misc. with H₂O, EtOH, Et₂O.

Losanitsch, *Compt. rend.*, 1911, **153**, 392.

2-Methylhexandiol-2 : 6 (1 : 1-Dimethyl-pentamethylene glycol, 5-methylhexandiol-1 : 5)

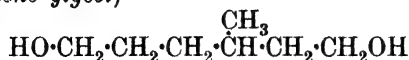


C₇H₁₆O₂

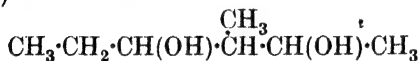
MW, 132

B.p. 135°/19 mm.

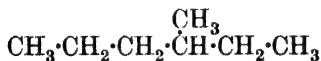
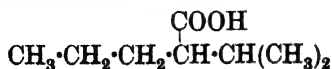
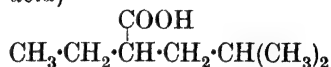
Franke, Kohn, *Monatsh.*, 1907, **28**, 1011.

3-Methylhexandiol-1 : 6 (*3-Methylhexamethylene glycol*)C₇H₁₆O₂ MW, 132

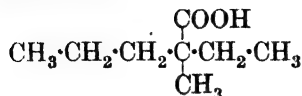
B.p. 160–5°/15 mm.

Bouveault, Blanc, *Compt. rend.*, 1903, **137**, 329.**3-Methylhexandiol-2 : 4** (*2-Methyl-1-ethyl-β-butylene glycol, 1 : 2-dimethyl-3-ethyltrimethylene glycol*)C₇H₁₆O₂ MW, 132

Thick oil. B.p. 116–18°/16 mm., 112–13°/10 mm.

Abelmann, *Ber.*, 1909, **42**, 2504.**2-Methylhexandione-3 : 5.***See* Isobutyrylacetone.**2-Methylhexandione-4 : 5.***See* Acetylisovaleryl.**3-Methylhexandione-2 : 4.***See unsym.*-Methylpropionylacetone.**3-Methylhexandione-2 : 5.***See* 3-Methylacetylacetone.**2-Methylhexane.***See* Isoheptane.**3-Methylhexane** (*Methylethylpropylmethane, 1-ethyl-1-propylethane*)C₇H₁₆ MW, 100*d.*B.p. 92°. D₄²⁰ 0.684. n_D²⁵ 1.3854. [α]_D²⁴ +1.67°.*l.*B.p. 92°. D₄²¹ 0.687. n_D²⁵ 1.3854. [α]_D²¹ –7.75°.*dl.*B.p. 91.8°/760 mm. D₂₀²⁰ 0.6868. n_D²⁰ 1.3865.de Graef, *Bull. soc. chim. Belg.*, 1925, **34**, 427.Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.**2-Methylhexane-3-carboxylic Acid** (*Propylisopropylacetic acid, 1-isopropylvaleric acid, 1-propylisovaleric acid*)C₈H₁₆O₂ MW, 144B.p. 112–13°/9 mm. D₁₇¹⁷ 0.9076.*Amide*: C₈H₁₇ON. MW, 143. Needles from H₂O. M.p. 131–3°. Resembles menthol in odour.Fischer, Holzapfel, Gwinner, *Ber.*, 1912, **45**, 256.**2-Methylhexane-4-carboxylic Acid** (*Ethylisobutylacetic acid, 1-isobutylbutyric acid, 1-ethylisocaproic acid*)C₈H₁₆O₂ MW, 144B.p. 219–20°/729 mm. D₁₅¹⁵ 0.906.*Et ester*: C₁₀H₂₀O₂. MW, 172. B.p. 178°/747 mm.*Amide*: C₈H₁₇ON. MW, 143. M.p. 89°.*Chloride*: C₈H₁₅OCl. MW, 162.5. B.p. 168–71°.*Anilide*: C₁₄H₂₁ON. MW, 219. Needles from 75% EtOH. M.p. 77–8°.*Hydrazide*: m.p. 74°.Guye, Jeanprêtre, *Bull. soc. chim.*, 1895, **13**, 183.Curtius et al., *J. prakt. Chem.*, 1930, **125**, 172.Tiffeneau, *Bull. soc. chim.*, 1923, **33**, 183.**2-Methylhexane-5-carboxylic Acid** (*Methylisoamylacetic acid, 1:4-dimethylcaproic acid, isoheptane-5-carboxylic acid, 1-isoamylpropionic acid*)C₈H₁₆O₂ MW, 144B.p. 228–30°, 127–30°/18 mm. D₄²⁰ 0.911. Sol. to 0.15% in H₂O at 15°.*Me ester*: C₉H₁₈O₂. MW, 158. B.p. 172–3°.*Et ester*: C₁₀H₂₀O₂. MW, 172. B.p. 175°.*Chloride*: C₈H₁₅OCl. MW, 162.5. B.p. 69°/16 mm. D₀⁰ 0.9574.*Amide*: C₈H₁₇ON. MW, 143. Cryst. from pet. ether. M.p. 99–100°.*p-Toluidide*: C₁₅H₂₃ON. MW, 233. M.p. 75°.Barbier, Locquin, *Compt. rend.*, 1913, **156**, 1445.Tiffeneau, Sommaire, *Bull. soc. chim.*, 1923, **33**, 193.Carleton-Williams, *J. Chem. Soc.*, 1879, **35**, 128.**3-Methylhexane-3-carboxylic Acid** (*Methylethylpropylacetic acid, 1-methyl-1-ethyl-*

valeric acid, 1-ethyl-1-propylpropionic acid, 1-methyl-1-propylbutyric acid)



$\text{C}_8\text{H}_{16}\text{O}_2$ MW, 144

B.p. 215–20°.

Amide: $\text{C}_8\text{H}_{17}\text{ON}$. MW, 143. Needles. M.p. 46°. B.p. 134–5°/12 mm. Very sol. EtOH, Et₂O, C₆H₆, pet. ether.

Haller, Bauer, *Compt. rend.*, 1909, 148, 130.

3-Methylhexane-4-carboxylic Acid (2-Methyl-1-ethylvaleric acid, 1-sec.-n-butylbutyric acid)



$\text{C}_8\text{H}_{16}\text{O}_2$ MW, 144

B.p. 217–20°. D_0 0.9339, D^{18} 0.921.

Me ester: $\text{C}_9\text{H}_{18}\text{O}_2$. MW, 158. B.p. 168–70°. D^{18} 0.8861.

Chloride: $\text{C}_8\text{H}_{15}\text{OCl}$. MW, 162.5. B.p. 66–72°/20 mm.

Amide: $\text{C}_8\text{H}_{17}\text{ON}$. MW, 143. M.p. 114–15°.

Anilide: $\text{C}_{14}\text{H}_{21}\text{ON}$. MW, 219. M.p. 108–9°.

Katznelson, Kondakova, *Chem. Abstracts*, 1934, 28, 5042.

2-Methylhexane-1 : 4-dicarboxylic Acid.

See 2-Methyl-4-ethyladipic Acid.

2-Methylhexane-2 : 5-dicarboxylic Acid.

See 1 : 1 : 4-Trimethyladipic Acid.

2-Methylhexane-3 : 3-dicarboxylic Acid.

See Propylisopropylmalonic Acid.

2-Methylhexane-3 : 6-dicarboxylic Acid.

See 1-Isopropyladipic Acid.

2-Methylhexane-4 : 5-dicarboxylic Acid.

See Methylisobutylsuccinic Acid.

2-Methylhexane-5 : 5-dicarboxylic Acid.

See Methylisoamylmalonic Acid.

2-Methylhexane-5 : 6-dicarboxylic Acid.

See Isoamylsuccinic Acid.

2-Methylhexane-6 : 6-dicarboxylic Acid.

See Isohexylmalonic Acid.

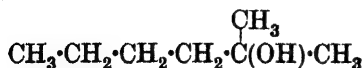
3-Methylhexane-1 : 6-dicarboxylic Acid.

See 3-Methylsuberic Acid.

Methylhexanol-1.

See Methyl-n-hexyl Alcohol.

2-Methylhexanol-2 (Dimethylbutylcarbinol, 2-hydroxyisoheptane, isoheptanol-2)



$\text{C}_7\text{H}_{16}\text{O}$

MW, 116

B.p. 139.4–140.4°/735 mm., 53–5°/15 mm. D_4^{20} 0.8119. n_D^{20} 1.4175.

Whitmore, Woodburn, *J. Am. Chem. Soc.*, 1933, 55, 362.

Whitmore, Badertscher, *ibid.*, 1560.

2-Methylhexanol-3.

See Propylisopropylcarbinol.

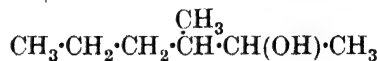
2-Methylhexanol-4.

See Ethylisobutylcarbinol.

2-Methylhexanol-5.

See Methylisoamylcarbinol.

3-Methylhexanol-2 (3-Propyl-sec.-n-butyl alcohol)



$\text{C}_7\text{H}_{16}\text{O}$

MW, 116

B.p. 79–81°/52 mm. D_4^{25} 0.8820. n_D^{25} 1.42066.

Bjelouss, *Ber.*, 1912, 45, 627.

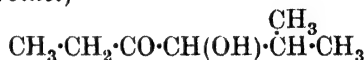
3-Methylhexanol-3.

See Methyl-ethylpropylcarbinol.

3-Methylhexanol-4.

See Ethyl-sec.-butylcarbinol.

2-Methyl-3-hexanolone-4 (Isopropylpropionylcarbinol)



$\text{C}_7\text{H}_{14}\text{O}_2$

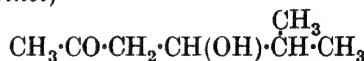
MW, 130

B.p. 85°/45 mm. Reduces Fehling's and $\text{NH}_3 \cdot \text{AgNO}_3$.

Semicarbazone: m.p. 90°.

Gauthier, *Compt. rend.*, 1911, 152, 1102.

2-Methyl-3-hexanolone-5 (Isopropylacetonylcarbinol)



$\text{C}_7\text{H}_{14}\text{O}_2$

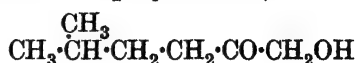
MW, 130

Oil. B.p. 90°/16 mm.

Oxime: oil. B.p. 126–9°/16 mm.

Franke, Kohn, *Monatsh.*, 1899, 20, 897.

2-Methyl-6-hexanolone-5 (5-Methyl-1-hexanolone-2, isocaproylcarbinol)



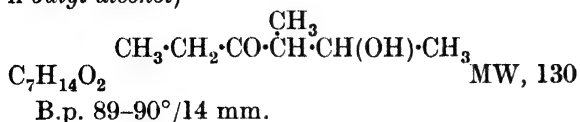
$\text{C}_7\text{H}_{14}\text{O}_2$

MW, 130

Et ether: $\text{C}_8\text{H}_{18}\text{O}_2$. MW, 158. B.p. 92.5°/18 mm., 82–3°/9.5 mm.

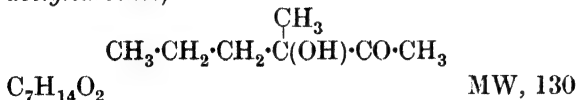
Blaise, Picard, *Ann. chim. phys.*, 1912, 25, 265.

3-Methyl-2-hexanolone-4 (3-Propionyl-sec.-n-butyl alcohol)



Blaise, Herman, *Compt. rend.*, 1908, **146**, 1327.

3-Methyl-3-hexanolone-2 (Methylpropyl-acetylcarbinol)

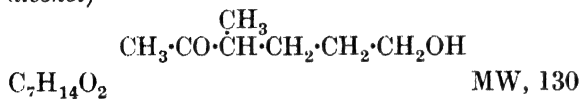


B.p. 166-8°. Sol. H₂O.

Semicarbazone: m.p. 163-4°.

Locquin, Sung, *Bull. soc. chim.*, 1924, **35**, 604.

3-Methyl-6-hexanolone-2 (4-Aceto-n-amyl alcohol)



Oil. B.p. 127°/20 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O.

Sachs, *Ber.*, 1899, **32**, 61.

2-Methylhexanone-3.

See Propyl isopropyl Ketone.

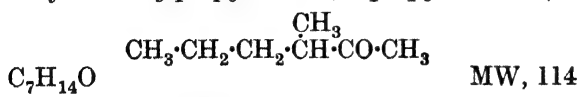
2-Methylhexanone-4.

See Ethyl isobutyl Ketone.

2-Methylhexanone-5.

See Methyl isoamyl Ketone.

3-Methylhexanone-2 (2-Acetopentane, unsym.-methylpropylacetone, 3-propylbutanone)



B.p. 142-5° (136-40°). D₄²⁰ 0.828. n_D²⁴ 1.409.

Oxime: b.p. 101-5°/20 mm.

Semicarbazone: plates from H₂O. M.p. 114°.

Hopff, *Ber.*, 1931, **64**, 2742.

Powell, Murray, Baldwin, *J. Am. Chem. Soc.*, 1933, **55**, 1153.

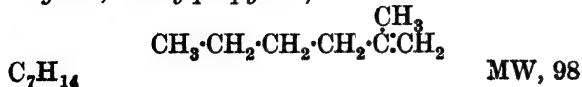
3-Methylhexanone-4.

See Ethyl sec.-butyl Ketone.

3-Methylhexanone-5.

See Methyl active-amyl Ketone.

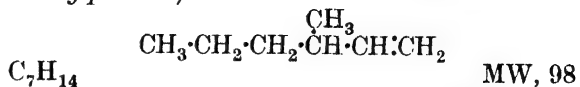
2-Methyl-1-hexene (unsym.-Methylbutyl-ethylene, 2-butylpropylene)



B.p. 91.1-91.5°. D₄²⁰ 0.7000. n_D²⁰ 1.4040.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 3295.

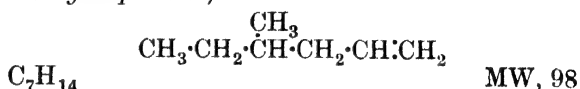
3-Methyl-1-hexene (3-Propyl-1-butylene, 2-vinylpentane)



B.p. 84-84.1°. D₄²⁰ 0.6945. n_D²⁰ 1.3970.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 3295.

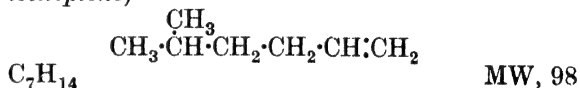
4-Methyl-1-hexene (active-Amylethylene, 1-vinylisopentane)



B.p. 87.2-87.5°. D₄²⁰ 0.6969. n_D²⁰ 1.3985.

See previous reference.

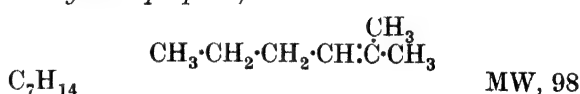
5-Methyl-1-hexene (Isoamylethylene, 1:2-isoeptene)



B.p. 84.7°. D₄²⁰ 0.6936. n_D²⁰ 1.3954.

See previous reference.

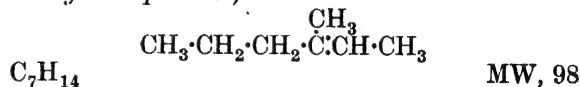
2-Methyl-2-hexene (1-Isopropylidenebutane, 2-butylidenepropane)



B.p. 94.4-94.6°. D₄²⁰ 0.7089. n_D²⁰ 1.4075.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 3296.

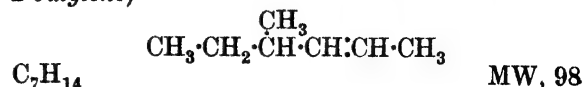
3-Methyl-2-hexene (2-Propyl-2-butylene, 2-ethylidenepentane)



B.p. 93.1-93.3° (85-90°). D₄²⁰ 0.7120. n_D²⁰ 1.4080.

See previous reference.

4-Methyl-2-hexene (Methyl-sec.-butyl-ethylene, 1-sec.-butylpropylene, 1-methyl-1-ethyl-2-butylene)

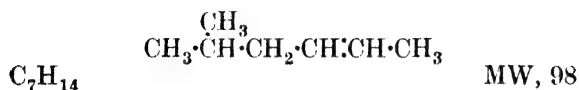


Exists in two forms:

- (i) B.p. 87.1–87.6°. D_4^{20} 0.7007. n_D^{20} 1.3980.
 (ii) B.p. 85.1–85.6°. D_4^{20} 0.6981. n_D^{20} 1.4000.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, 55, 3295.

5-Methyl-2-hexene (1-Isopropyl-2-butylene, 1-isobutylpropylene)

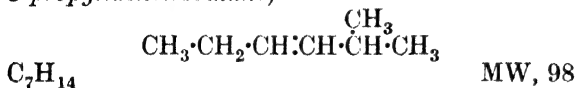


Exists in two forms.

- (i) B.p. 91.1–91.6°. D_4^{20} 0.6990. n_D^{20} 1.3990.
 (ii) B.p. 85.6–86.1°. D_4^{20} 0.7020. n_D^{20} 1.3995.

See previous reference.

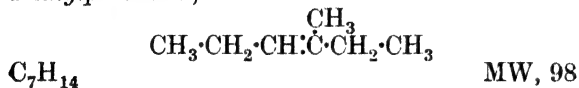
2-Methyl-3-hexene (1-Isopropyl-1-butylene, 3-propylideneisobutane)



B.p. 86.4–86.9°. D_4^{20} 0.6942. n_D^{20} 1.3991.

See previous reference.

3-Methyl-3-hexene (2-Propylidenebutane, 2-ethylpentene-2)



B.p. 93.8–94.2°.

Favorski, Zaleskii-Kibardine, *Chem. Abstracts*, 1926, 20, 2481.

Methylhexene-1-carboxylic Acid.

See Methylheptenic Acid.

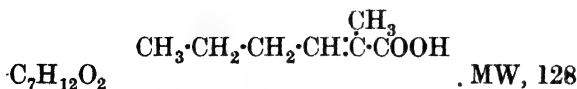
5-Methyl-1-hexene-1 : 2-dicarboxylic Acid.

See Isoamylfumaric Acid and Isoamylmaleic Acid.

5-Methyl-1-hexene-4 : 4-dicarboxylic Acid.

See Isopropylallylmalonic Acid.

1-Methyl-1-hexenic Acid (1-Butylidene-propionic acid, 1-methyl-2-propylacrylic acid)

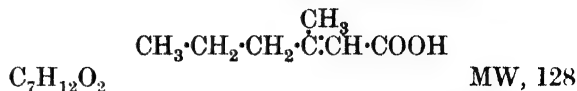


B.p. 118°/11 mm. D_4^{20} 0.9627. n_D^{20} 1.4601.

Et ester: $\text{C}_9\text{H}_{16}\text{O}_2$. MW, 156. B.p. 72°/10 mm. D_4^{20} 0.9031. n_D^{20} 1.4407.

Kon, Linstead, MacLennan, *J. Chem. Soc.*, 1932, 2458.

2-Methyl-1-hexenic Acid (2-Methyl-propylacrylic acid, 2-propylcrotonic acid)



Exists in two forms. (i) Cryst. from C_6H_6 . M.p. 40°. (ii) Non-crystallisable oil.

Mixture of (i) and (ii):

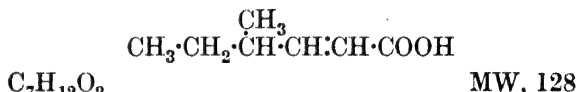
Mobile liq. B.p. 222–5°, 120°/14 mm. $D_4^{19.2}$ 0.96836. $n_D^{19.2}$ 1.46659.

Nitrile: $\text{C}_7\text{H}_{11}\text{N}$. MW, 109. Oil. B.p. 95–6°/30 mm.

Kon, Leton, Linstead, Parsons, *J. Chem. Soc.*, 1931, 1414.

Gardner, Haworth, *J. Chem. Soc.*, 1909, 95, 1963.

3-Methyl-1-hexenic Acid (2-sec.-n-Butylacrylic acid, 3-methyl-3-ethylcrotonic acid)



B.p. 125°/13 mm. $D_4^{20.3}$ 0.9441. $n_D^{20.3}$ 1.4526.

Chloride: $\text{C}_7\text{H}_{11}\text{OCl}$. MW, 146.5. B.p. 65–6°/11 mm.

Anilide: $\text{C}_{13}\text{H}_{17}\text{ON}$. MW, 203. Needles from C_6H_6 -pet. ether. M.p. 110°.

p-Toluidide: $\text{C}_{14}\text{H}_{19}\text{ON}$. MW, 217. Needles from EtOH. M.p. 92°.

Linstead, Mann, *J. Chem. Soc.*, 1930, 2071.

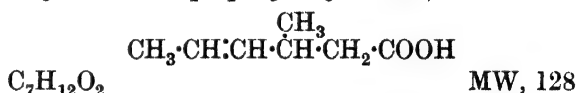
4-Methyl-1-hexenic Acid.

See 1-Isoheptenic Acid.

Methyl-2-hexenic Acid.

See Methylhydrosorbic Acid and 2-Isoheptenic Acid.

2-Methyl-3-hexenic Acid (1-Ethylideneisobutyric acid, 2-propenylbutyric acid)



B.p. 209–10°, 103–5°/9 mm. Spar. sol. H_2O .

Dibromide: plates from CHCl_3 -ligroin. M.p. 135–6°. Insol. H_2O .

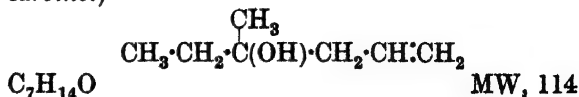
v. Pechmann, *Ber.*, 1900, 33, 3340.

Burton, Ingold, *J. Chem. Soc.*, 1929, 2031.

4-Methyl-3-hexenic Acid.

See 3-Isoheptenic Acid.

4-Methyl-1-hexenol-4 (Methylethylallylcarbinol)



B.p. 139°. D^0 0.85865, D^{20} 0.84315. Heat of comb. C_p 1060.7 Cal.

Saizew, *J. Russ. Phys.-Chem. Soc.*, 1892, **24**, 469.

5 - Methyl - 1 - hexenol - 3 (*Isobutylvinyl-carbinol*)

$$\text{CH}_3 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH}_2 \cdot \text{CH}(\text{OH}) \cdot \text{CH} \cdot \text{CH}_2$$

 $C_7H_{14}O$ MW, 114

B.p. 125°, 54–5°/12 mm. D_4^{15} 0.8306, D^{23} 0.8368. n_D^{23} 1.4263.

Douris, *Compt. rend.*, 1913, **157**, 57.

Bouis, *Ann. chim.*, 1928, **9**, 402.

5-Methyl-1-hexenol-4.

See Isopropylallylcarbinol.

5-Methyl-1-hexenol-5 (*Dimethyl- γ -butenyl-carbinol*)

$$\text{CH}_3 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}}(\text{OH}) \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH} \cdot \text{CH}_2$$

 $C_7H_{14}O$ MW, 114

B.p. 142.5°, 57°/16 mm. Mod. sol. H_2O . $D_4^{17.4}$ 0.8376, $D_4^{19.1}$ 0.8397. $n_D^{17.8}$ 1.43486.

Auwers, Moosbrugger, *Ann.*, 1912, **387**, 180.

Harries, Langheld, *Ann.*, 1905, **343**, 347.

3-Methyl-2-hexenol-4 (*Ethylisobutenyl-carbinol*)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}(\text{OH}) \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH} \cdot \text{CH}_3$$

 $C_7H_{14}O$ MW, 114

B.p. 154–5°, 94–5°/80 mm., 71–3°/28 mm. D^0 0.8857, D_4^{10} 0.8704. n_D^{10} 1.44914.

Abelmann, *Ber.*, 1910, **43**, 1580.

4-Methyl-2-hexenol-4 (*Methylethylpropenyl-carbinol*)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}}(\text{OH}) \cdot \text{CH} \cdot \text{CH} \cdot \text{CH}_3$$

 $C_7H_{14}O$ MW, 114

B.p. 72–3°/60 mm. D^0 0.8471, $D_4^{12.5}$ 0.8360. $n_D^{16.5}$ 1.4268.

Gry, *Bull. soc. chim.*, 1908, **3**, 379.

5 - Methyl - 2 - hexenol - 1 (*3-Isobutylallyl alcohol*)

$$\text{CH}_3 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH}_2 \cdot \text{CH} \cdot \text{CH} \cdot \text{CH}_2\text{OH}$$

 $C_7H_{14}O$ MW, 114

B.p. 169°. D^{20} 0.8355. n_D^{20} 1.4390.

Acetyl: b.p. 182–4°. D^{20} 0.8836. n_D^{20} 1.4280.

Bouis, *Ann. chim.*, 1928, **9**, 402.

5-Methyl-2-hexenol-4 (*Isopropylpropenyl-carbinol*)

$$\text{CH}_3 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH}(\text{OH}) \cdot \text{CH} \cdot \text{CH} \cdot \text{CH}_3$$

 $C_7H_{14}O$ MW, 114

B.p. 139–40°, 92–4°/105 mm. D^0 0.8496, D_4^{20} 0.8426. n_D^{20} 1.438.

Reif, *Ber.*, 1908, **41**, 2739.

2-Methyl-3-hexenol-2 (*Dimethyl- α -butenyl-carbinol*)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH} \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}}(\text{OH}) \cdot \text{CH}_3$$

 $C_7H_{14}O$ MW, 114

B.p. 49°/11 mm. D^{18} 0.8536. n_D^{18} 1.443.

Pastureau, Zamenhof, *Bull. soc. chim.*, 1926, **39**, 1430.

3-Methyl-3-hexenol-2

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH}(\text{OH}) \cdot \text{CH}_3$$

 $C_7H_{14}O$ MW, 114

B.p. 89°/55 mm. D_4^{25} 0.8678. n_D^{25} 1.44874.

Grignard, *Chem. Zentr.*, 1901, II, 622.

4-Methyl-1-hexenone-5 (*4-Aceto-1-pentene*)

$$\text{CH}_3 \cdot \text{CO} \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH}_2 \cdot \text{CH} \cdot \text{CH}_2$$

 $C_7H_{12}O$ MW, 112

Oil. B.p. 138–40°. D^{15} 0.845.

Jacobi, Merling, *Ann.*, 1894, **278**, 11.

5-Methyl-1-hexenone-3 (*Isobutyl vinyl ketone*)

$$\text{CH}_3 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH}_2 \cdot \text{CO} \cdot \text{CH} \cdot \text{CH}_2$$

 $C_7H_{12}O$ MW, 112

B.p. 32°/10 mm.

Blaise, Maire, *Compt. rend.*, 1906, **142**, 216

2-Methyl-2-hexenone-4 (*1-Methyl-2-isopropylideneacetone, 1-propionylisobutylene*)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CO} \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH}_3$$

 $C_7H_{12}O$ MW, 112

B.p. 148°.

Semicarbazone: cryst. from EtOH.Aq. M.p. 162°.

Blaise, Maire, *Ann. chim. phys.*, 1908, **15**, 571.

2-Methyl-2-hexenone-5 (*2-Methyl-4-aceto-2-butylene*)

$$\text{CH}_3 \cdot \text{CO} \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH}_3$$

 $C_7H_{12}O$ MW, 112

B.p. 72-4°/30 mm. $D_4^{21.5}$ 0.9012. $n_D^{21.5}$ 1.4317.
Semicarbazone: plates from EtOH.Aq. M.p. 159-60°.

Eccott, Linstead, *J. Chem. Soc.*, 1930, 918.

3-Methyl-2-hexenone-4 (2-Propionyl-2-butylene)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CO} \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH} \cdot \text{CH}_3$$

 $\text{C}_7\text{H}_{12}\text{O}$ MW, 112

B.p. 54.5°/18 mm., 50.5°/13 mm.
Semicarbazone: m.p. 161-2°.
p-Nitrophenylhydrazone: yellowish-red needles from AcOH. M.p. 134°.

Blaise, Herman, *Compt. rend.*, 1908, **146**, 1326.

2-Methyl-3-hexenone-5.

See Isobutyrideneacetone.

3-Methyl-3-hexenone-2 (2-Aceto-2-pentene, 1-methyl-1-propylideneacetone)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH} \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CO} \cdot \text{CH}_3$$

 $\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Oil. B.p. 151° slight decomp., 55-60°/14 mm.

Benary, *Ber.*, 1931, **64**, 2544.

4-Methyl-3-hexenone-2

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH} \cdot \text{CO} \cdot \text{CH}_3$$

 $\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Oil. B.p. 147-53°.

Kondakow, *J. Russ. Phys.-Chem. Soc.*, 1894, **26**, 8.

5-Methyl-1-hexine.

See Isoamylacetylene.

unsym.-Methylhexylacetone.

See 3-Methylnonanone-2.

2-Methyl-*n*-hexyl Alcohol (2-Methylhexanol-1)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2\text{OH}$$

 $\text{C}_7\text{H}_{16}\text{O}$ MW, 116

d.

B.p. 71-2°/15 mm. $[\alpha]_D^{25} + 2.47^\circ$ in EtOH.

dl.

B.p. 162-4°/750 mm. D_4^{25} 0.8270. n_D^{25} 1.4226.

Levene, Mikeska, *J. Biol. Chem.*, 1929, **84**, 571.

Zelinsky, Prewalski, *Chem. Zentr.*, 1908, **II**, 1855.

3-Methyl-*n*-hexyl Alcohol (3-Methylhexanol-1)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \text{CH}_2\text{OH}$$

 $\text{C}_7\text{H}_{16}\text{O}$ MW, 116

l.

B.p. 80°/25 mm. D_4^{29} 0.8208. n_D^{30} 1.4202.
 $[\alpha]_D^{27} - 1.60^\circ$ in CHCl_3 .

1-Naphthylurethane: m.p. 73°.

dl.

B.p. 168-9°/754 mm. D^{20} 0.8258. n_D^{20} 1.4245.
Acetyl: b.p. 183-4°/754 mm. D^{20} 0.8743. n_D^{20} 1.4156.

1-Naphthylurethane: m.p. 45-7°.

Dewael, Weckering, *Bull. soc. chim. Belg.*, 1924, **33**, 495.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 89.

4-Methyl-*n*-hexyl Alcohol (4-Methylhexanol-1)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2\text{OH}$$

 $\text{C}_7\text{H}_{16}\text{O}$ MW, 116

d.

B.p. 77°/20 mm. D_4^{23} 1.809. n_D^{25} 1.4233.
 $[\alpha]_D^{23} + 1.94^\circ$.

dl.

B.p. 173°/761 mm. D^{20} 0.8239. n_D^{20} 1.4219.
Acetyl: b.p. 190°/757 mm. D^{20} 0.8740. n_D^{20} 1.4186.

1-Naphthylurethane: m.p. 50°.

See previous references.

5-Methyl-*n*-hexyl Alcohol.

See Isoheptyl Alcohol.

2-Methyl-*n*-hexylamine

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2\text{NH}_2$$

 $\text{C}_7\text{H}_{17}\text{N}$ MW, 115

l.

B.p. 62°/22 mm., 49-54°/15 mm. D_4^{27} 0.773.
 $[\alpha]_D^{25} - 11.75^\circ$.

B.HCl: $[\alpha]_D^{25} - 2.41^\circ$ in H_2O .

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 163.

3-Methyl-*n*-hexylamine

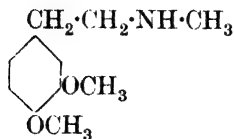
$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \text{CH}_2\text{NH}_2$$

 $\text{C}_7\text{H}_{17}\text{N}$ MW, 115

l.

B.p. 67°/45 mm. D_4^{26} 0.772. n_D^{25} 1.4249. $[\alpha]_D^{26} - 0.25^\circ$.

N-Methylhomoveratrylamine (4-β-Methyl-aminoethylveratrol, methyl-3 : 4-dimethoxyphenylethyl-amine)



$\text{C}_{11}\text{H}_{17}\text{O}_2\text{N}$ MW, 195

Oil. B.p. $159^\circ/11$ mm. D_4^{20} 1.0597. n_D^{15} 1.5362. Very sol. H_2O with alk. reaction.

B,HI: cryst. from 90% EtOH. M.p. 131° . Very sol. H_2O . Sol. EtOH. Spar. sol. Et_2O .

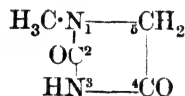
$\text{B}_2\text{H}_2\text{PtCl}_6$: m.p. 190° decomp.

$\text{B}_2\text{H}_2\text{AuCl}_4$: m.p. 148° decomp.

Picrate: m.p. $162-3^\circ$.

Buck, *J. Am. Chem. Soc.*, 1930, 52, 4120.

1-Methylhydantoin



$\text{C}_4\text{H}_6\text{O}_2\text{N}_2$ MW, 114

Prisms from C_6H_6 . M.p. $184-5^\circ$. Sol. hot H_2O , EtOH, CHCl_3 . Spar. sol. Et_2O .

3-Acetyl: needles from H_2O . M.p. $134-5^\circ$.

Fischer, *Ach. Ber.*, 1899, 32, 2746.

Gaebler, *J. Biol. Chem.*, 1926, 69, 615.

3-Methylhydantoin.

Prisms from H_2O . M.p. $155-7^\circ$. Sol. H_2O , EtOH. Sublimes.

Weitzner, *Ann.*, 1908, 362, 125.

West, *J. Biol. Chem.*, 1918, 34, 189.

5-Methylhydantoin.

Prisms + H_2O . M.p. anhyd. $145-6^\circ$. Sol. H_2O , EtOH. Spar. sol. Et_2O . Reacts neutral. $\text{Ba}(\text{OH})_2$ at $130-45^\circ \rightarrow$ alanine + CO_2 + NH_3 .

Bucherer, Steiner, *J. prakt. Chem.*, 1934, 140, 316.

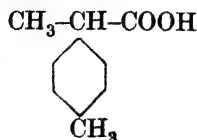
1-Methylhydracrylic Acid.

See 2-Hydroxyisobutyric Acid.

1-Methylhydratropic Acid.

See 1-Phenylisobutyric Acid.

p-Methylhydratropic Acid (1-p-Tolylpropionic acid, methyl-p-tolylacetic acid)



$\text{C}_{10}\text{H}_{12}\text{O}_2$

MW, 164

Cryst. M.p. $40-1^\circ$ (34°). B.p. 280° , $161-161.5^\circ/12.5$ mm.

Et ester: $\text{C}_{12}\text{H}_{16}\text{O}_2$. MW, 192. Oil. B.p. $123.5^\circ/11$ mm.

Amide: $\text{C}_{10}\text{H}_{13}\text{ON}$. MW, 163. Cryst. from C_6H_6 . M.p. 195° . Very sol. EtOH, MeOH, CHCl_3 . Sol. hot H_2O , C_6H_6 . Spar. sol. Et_2O , ligroin.

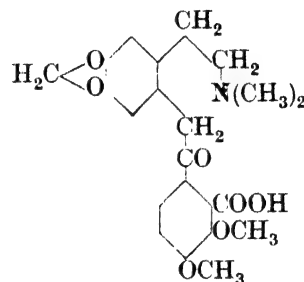
Nitrile: $\text{C}_{10}\text{H}_{11}\text{N}$. MW, 145. B.p. $246.5-247.5^\circ$, $123^\circ/12.5$ mm.

p-Toluidide: $\text{C}_{17}\text{H}_{19}\text{ON}$. MW, 253. Cryst. from EtOH. M.p. $102-3^\circ$.

Rupe, Wiederkehr, *Helv. Chim. Acta*, 1924, 7, 657.

Methylhydrastine

(Methylhydrastine hydrate)



$\text{C}_{22}\text{H}_{25}\text{O}_7\text{N}$

MW, 415

Needles + $2\text{H}_2\text{O}$ from H_2O or EtOH.Aq. M.p. $151-2^\circ$. Sol. hot H_2O , EtOH, alkalis.

B,HCl: needles from EtOH- Et_2O . M.p. $182-3^\circ$.

B,HI: cryst. from EtOH. M.p. $216-17^\circ$.

$\text{B}_2\text{H}_2\text{PtCl}_6$: yellow cryst. M.p. 208° .

Oxime: prisms from boiling EtOH.Aq. M.p. $202-3^\circ$ decomp. Insol. H_2O , boiling EtOH.

Me ester: $\text{C}_{23}\text{H}_{27}\text{O}_7\text{N}$. MW, 429. Cryst. from MeOH. M.p. 175° .

Et ester: $\text{C}_{24}\text{H}_{29}\text{O}_7\text{N}$. MW, 443. Yellow cryst. from EtOH. M.p. $194-5^\circ$ ($95-6^\circ$). B,HNO_3 : needles from EtOH- Et_2O . M.p. $145-6^\circ$. *B,HI*: yellow plates from H_2O . M.p. $235-6^\circ$. $\text{B}_2\text{H}_2\text{PtCl}_6$: yellow powder. M.p. 210° ($163-4^\circ$) decomp.

Amide: $\text{C}_{22}\text{H}_{26}\text{O}_6\text{N}_2$. MW, 414. Plates from EtOH. M.p. 180° . Sol. CHCl_3 . Spar. sol. H_2O , Et_2O , C_6H_6 , CS_2 . *B,HCl*: needles + $2\text{H}_2\text{O}$. M.p. $116-18^\circ$. *B,HI*: cryst. M.p. $233-5^\circ$.

Methylamide: cryst. from EtOH. M.p. 182° . *B,HCl*: needles. M.p. 193° .

Ethylamide: cryst. M.p. 162° .

Isoamylamide: cryst. from EtOH. M.p. 171° .

Allylamide: cryst. from EtOH. M.p. 158° .

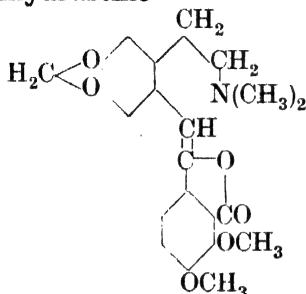
Imide: cryst. from EtOH. M.p. 192°. *B,HI*: cubes. M.p. 235-7°.

Addinall, Major, *J. Am. Chem. Soc.*, 1933, 55, 2160.

Schmidt, Schmidt, *Arch. Pharm.*, 1890, 228, 243.

Freund, Heim, *Ber.*, 1890, 23, 2897.

Methylhydrastine



$C_{22}H_{23}O_6N$

MW, 397

Yellow needles from EtOH. M.p. 156-7°. Sol. EtOH, Et₂O, C₆H₆, CS₂, AcOEt. Insol. H₂O. Alc. sol. shows green fluor.

B,HCl: yellow needles + H₂O from EtOH. M.p. 233-4°. Sol. H₂O.

B,HI: prisms from EtOH.Aq. M.p. 257-8°. Mod. sol. hot H₂O. Spar. sol. EtOH.

B,HNO₃: yellow needles. M.p. 230-1°. Spar. sol. H₂O.

B,H₂SO₄: yellow needles from EtOH. M.p. 250°.

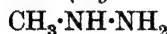
B₂H₂PtCl₆: yellow amorph. solid + 2H₂O. M.p. 199-200°.

Methiodide: yellow prisms from EtOH.Aq. M.p. 250-1°. Sol. EtOH. Less sol. H₂O.

Hydrate: see Methylhydrastine.

See first two references above.

Methylhydrazine (Hydrazinomethane)



CH_6N_2

MW, 46

B.p. 87°/745 mm. Sol. H₂O, EtOH, Et₂O. Reduces Fehling's.

B,H₂SO₄: cryst. from MeOH. M.p. 142°. Sol. H₂O. Spar. sol. EtOH.

Oxalate: needles from EtOH.Aq. M.p. 166°. Sol. H₂O. Insol. EtOH.

Picrate: yellow needles from EtOH. M.p. 166° (162°).

v. Brünig, *Ann.*, 1889, 253, 7.

2-Methylhydrazobenzene (sym.-Phenyl-o-tolylhydrazine)



$C_{13}H_{14}N_2$

MW, 198

Plates from EtOH. M.p. 101-2°. Sol. Et₂O, C₆H₆. Spar. sol. EtOH, pet. ether. Insol. H₂O.

Bayer, D.R.P., 52,839.

Jacobson, Lischke, *Ber.*, 1895, 28, 2544.

3-Methylhydrazobenzene (sym.-Phenyl-m-tolylhydrazine).

Yellow cryst. from pet. ether. M.p. 59-61°. Very sol. EtOH. Sol. C₆H₆. Spar. sol. Et₂O.

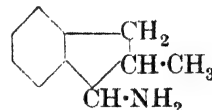
Jacobson, Nanninga, *Ber.*, 1895, 28, 2549.

4-Methylhydrazobenzene (sym.-Phenyl-p-tolylhydrazine).

Plates from ligroin. M.p. 91° (86-7°). Sol. EtOH, C₆H₆.

Jacobson, Lischke, *Ann.*, 1898, 303, 369.

2-Methyl-1-hydrindamine (2-Methyl-1-indanamine)



$C_{10}H_{13}N$

MW, 147

d.

Free base strongly dextrorotatory in EtOH.Aq.

Acid-d-tartrate: cryst. M.p. 153-5°. Mod. sol. H₂O, EtOH. Almost insol. Et₂O, CHCl₃, AcOEt, pet. ether. $[\alpha]_D + 32.4^\circ$ in H₂O.

Acid-l-tartrate: cryst. from H₂O. M.p. 197°. $[\alpha]_D - 6.5^\circ$ in H₂O.

Phenyl-p-tolylphosphate: cryst. from AcOEt-Et₂O. M.p. 135-7°. Very sol. MeOH. Sol. hot Me₂CO, hot AcOEt. Almost insol. cold H₂O. $[\alpha]_D + 16.9^\circ$ in MeOH.

3-Chloro-d-camphor-8-sulphonate: needles from H₂O. Exists in two forms. (i) M.p. 247°. $[\alpha]_D + 56.2^\circ$ in CHCl₃, + 60.2° in H₂O. (ii) M.p. 225-30°. $[\alpha]_D + 63.6^\circ$ in CHCl₃, + 63.4° in H₂O.

3-Bromo-d-camphor-8-sulphonate: needles from H₂O. M.p. about 249°. Sol. hot H₂O, EtOH, CHCl₃. Almost insol. AcOEt. $[\alpha]_D + 71.4^\circ$ in H₂O, + 65.2° in CHCl₃.

l.

Free base strongly laevorotatory in EtOH.Aq. *B,HCl*: needles or plates from H₂O. $[\alpha]_D - 31.20^\circ$ in H₂O.

Acid-d-tartrate: prisms from H₂O. M.p. 197°. Sol. H₂O. Spar. sol. EtOH. Almost insol. CHCl₃, Et₂O, pet. ether. $[\alpha]_D - 5.0^\circ$ in H₂O.

3-Chloro-d-camphor-8-sulphonate: needles from H₂O. Exists in two forms. (i) M.p. 239°.

$[\alpha]_D + 3.4^\circ$ in CHCl_3 , $+ 34.1^\circ$ in H_2O . (ii) M.p. $231-3^\circ$. $[\alpha]_D + 8.2^\circ$ in CHCl_3 , $+ 35.8^\circ$ in H_2O .

3-Bromo-d-camphor-8-sulphonate: needles from H_2O . M.p. 230° . Sol. H_2O , EtOH , CHCl_3 . Insol. Et_2O , AcOEt , pet. ether. $[\alpha]_D + 45.9^\circ$ in H_2O , $+ 19.5^\circ$ in CHCl_3 .

dl-.

B.p. $231-5^\circ/760$ mm. D_4^{20} 0.9939. n_D^{20} 1.5410.

B, HCl : needles. Decomp. at 230° .

$B_2, \text{H}_2\text{SO}_4$: needles from H_2O , plates from EtOH . Decomp. at $233-5^\circ$.

Acid oxalate: needles $+ \text{H}_2\text{O}$ from H_2O . M.p. $110-11^\circ$, anhyd. $143-5^\circ$.

N-Benzoyl: m.p. 150° .

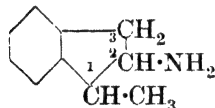
Picrate: yellow plates from EtOH . M.p. 230° .

3-Bromo-d-camphor-8-sulphonate: prisms from Me_2CO . M.p. $171-3^\circ$. $[\alpha]_D + 51.8^\circ$ in H_2O , $+ 44.1^\circ$ in CHCl_3 .

Tattersall, Kipping, *J. Chem. Soc.*, 1903, 83, 925.

Kishner, *J. Russ. Phys.-Chem. Soc.*, 1914, 46, 1418.

1-Methyl-2-hydrindamine (1-Methyl-2-indanamine)



$\text{C}_{10}\text{H}_{13}\text{N}$

MW, 147

B.p. $108-10^\circ/11$ mm.

B, HCl : m.p. 202° .

N-Benzoyl: cryst. from EtOH . M.p. 137° .

Picrate: m.p. 239° .

v. Braun, Danziger, Koehler, *Ber.*, 1917, 50, 63.

2-Methyl-2-hydrindamine (2-Methyl-2-indanamine).

B.p. $118-19^\circ/18$ mm. Spar. sol. H_2O . Alk. $\text{KMnO}_4 \rightarrow$ phthalic acid.

B, HCl : m.p. 241° . Sol. hot EtOH .

B, HBr : m.p. $290-3^\circ$.

$B_2, \text{H}_2\text{PtCl}_6$: yellow cryst. from EtOH . Decomp. at 220° . Spar. sol. H_2O .

N-Me: $\text{C}_{11}\text{H}_{15}\text{N}$. MW, 161. B.p. $113-18^\circ/15$ mm. B, HCl : cryst. M.p. 212° . $B_2, \text{H}_2\text{PtCl}_6$: m.p. 197° . Benzoyl: cryst. M.p. $95-7^\circ$. Benzenesulphonyl: m.p. $93-5^\circ$. Picrate: yellow cryst. M.p. $198-9^\circ$.

N-Acetyl: cryst. M.p. 127° . Very sol. H_2O . Reacts neutral.

N-Benzoyl: needles from EtOH . M.p. 160° ($150-2^\circ$).

N-Benzenesulphonyl: cryst. from EtOH.Aq . M.p. 104° .

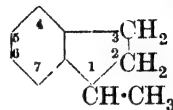
N-Salicylidene: yellow cryst. M.p. 92° .

Oxalate: needles from H_2O . M.p. $216-20^\circ$ decomp.

Picrate: needles from EtOH . M.p. 244° .

v. Braun, Kruber, Danziger, *Ber.*, 1916, 49, 2648.

1-Methylhydrindene (1-Methylindane)



$\text{C}_{10}\text{H}_{12}$

MW, 132

B.p. $182-3^\circ$, $60-70^\circ/12$ mm. D_4^{16} 0.9661. n_D 1.5394.

v. Braun, Neumann, *Ber.*, 1917, 50, 55.

2-Methylhydrindene (2-Methylindane).

B.p. $183-5^\circ/747$ mm. D_6^{17} 0.9034. n_D^{17} 1.5070.

Kishner, *J. Russ. Phys.-Chem. Soc.*, 1914, 46, 1420.

4-Methylhydrindene (4-Methylindane).

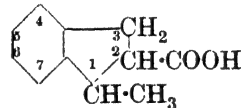
Oil present in coal tar. B.p. 203° . D_4^0 0.9350.

Kruber, *Ber.*, 1924, 57, 1010.

Methylhydrindene-carboxylic Acid.

See Methylhydrindenic Acid.

1-Methyl-2-hydrindenic Acid (1-Methylindane-2-carboxylic acid, 1-methylhydrindene-2-carboxylic acid)



$\text{C}_{11}\text{H}_{12}\text{O}_2$

MW, 176

dl-.

Needles. M.p. 86° . Sol. usual org. solvents. $[\alpha]_D + 67.28^\circ$ in EtOH , $+ 89.33^\circ$ in toluene, $+ 76.86^\circ$ in C_6H_6 .

Me ester: $\text{C}_{12}\text{H}_{14}\text{O}_2$. MW, 190. Cryst. from MeOH . M.p. 68° . $[\alpha]_D + 63.22^\circ$ in EtOH .

Ba salt: needles from EtOH . $[\alpha]_D + 24.02^\circ$ in H_2O .

l-.

Needles from EtOH.Aq . M.p. 86° . $[\alpha]_D - 66.66^\circ$ in EtOH , $- 75.56^\circ$ in C_6H_6 .

dl-.

Needles from H_2O . M.p. 82° . B.p. $300-310^\circ$. Sol. EtOH , Et_2O . Mod. sol. hot H_2O . Volatile in steam.

Et ester: $\text{C}_{13}\text{H}_{16}\text{O}_2$. MW, 204. B.p. $150-1^\circ/11$ mm.

Chloride: $\text{C}_{11}\text{H}_{11}\text{OCl}$. MW, 194.5. B.p. $150^\circ/20$ mm.

Amide: $C_{11}H_{13}ON$. MW, 175. Cryst. M.p. 130°. Sol. EtOH, Et₂O.

v. Braun, Danziger, Koehler, *Ber.*, 1917, 50, 62.

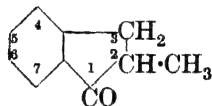
Neville, *J. Chem. Soc.*, 1906, 89, 384.

1-Methyl-4-hydrindenic Acid (1-Methylindane-4-carboxylic acid, 1-methylhydrindene-4-carboxylic acid).

Prisms from Me₂CO.Aq. M.p. 138-9°.

Hoyer, *J. prakt. Chem.*, 1934, 139, 242.

2-Methyl-1-hydrindone (2-Methylindanone-1)



$C_{10}H_{10}O$ MW, 146

Oil. B.p. 250°/756 mm., 125°/18 mm., 111-12°/9 mm. $D_4^{21.2}$ 1.0651. n_D^{25} 1.553.

Oxime: cryst. from MeOH.Aq. or pet. ether. M.p. 105-6°. Sol. EtOH, Et₂O. Spar. sol. pet. ether. Insol. H₂O.

Semicarbazone: needles from EtOH.Aq. M.p. 198° (190°). Sol. EtOH, AcOH. Spar. sol. other solvents.

Hydrazone: m.p. 72°. B.p. 166°/14 mm.

Phenylhydrazone: m.p. 95°.

p-Nitrophenylhydrazone: m.p. 167-8°.

Mitchell, Thorpe, *J. Chem. Soc.*, 1910, 97, 2275, 2724.

Kishner, *J. Russ. Phys.-Chem. Soc.*, 1914, 46, 1413.

3-Methyl-1-hydrindone (3-Methylindanone-1).

Yellow oil. B.p. 118-19°/11 mm.

Oxime: cryst. from EtOH. M.p. 141.5°.

Semicarbazone: cryst. from EtOH. M.p. 230-1°.

v. Braun, Kirschbaum, *Ber.*, 1913, 46, 3044.

I.G., Swiss P., 127,693, (*Chem. Abstracts*, 1929, 23, 1416).

4-Methyl-1-hydrindone (4-Methylindanone-1).

Needles from ligroin. M.p. 95°. Sol. usual solvents. Very volatile in steam. Hot dil. HNO₃ → 3-methylphthalic acid.

Phenylhydrazone: needles from dil. EtOH. M.p. 132° decomp.

Young, *Ber.*, 1892, 25, 2104.

I.G., D.R.P., 464,087, (*Chem. Abstracts*, 1928, 22, 4130).

Diet. of Org. Comp.—II.

6-Methyl-1-hydrindone (6-Methylindanone-1).

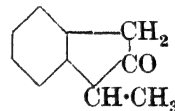
Needles from ligroin. M.p. 63°. Sol. EtOH, Et₂O, C₆H₆, ligroin.

Phenylhydrazone: needles from dil. EtOH. M.p. 133° decomp.

v. Miller, Rohde, *Ber.*, 1890, 23, 1898.

I.G., E.P., 288,441, (*Chem. Abstracts*, 1929, 23, 606).

1-Methyl-2-hydrindone (1-Methylindanone-2)



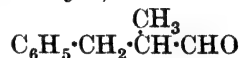
$C_{10}H_{10}O$ MW, 146

Plates from MeOH. M.p. 62-3°. Stable to KMnO₄.

Semicarbazone: m.p. 195°.

Wallach, Beschke, *Ann.*, 1904, 336, 6.

α-Methylhydrocinnamaldehyde (1-Benzylpropionaldehyde, methylbenzylacetaldehyde, 2-phenylisobutyraldehyde)



$C_{10}H_{12}O$ MW, 148

B.p. 226-7°/760 mm., 129-30°/19 mm. Forms cryst. bisulphite comp. Reduces NH₃. AgNO₃.

Semicarbazone: m.p. 70-2°.

Darzens, *Compt. rend.*, 1904, 139, 1216.

v. Miller, Rohde, *Ber.*, 1890, 23, 1080.

β-Methylhydrocinnamaldehyde (2-Phenylbutyraldehyde)

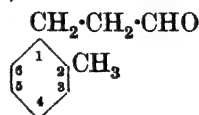


$C_{10}H_{12}O$ MW, 148

B.p. 110°/9 mm.

v. Braun, Grabowski, Kirschbaum, *Ber.*, 1913, 46, 1282.

o-Methylhydrocinnamaldehyde (2-o-Tolylpropionaldehyde)



$C_{10}H_{12}O$ MW, 148

B.p. 120°/13 mm. $D_4^{19.5}$ 0.998. $n_D^{19.5}$ 1.522.

Semicarbazone: m.p. 153°.

Bert, *Compt. rend.*, 1928, 186, 699.

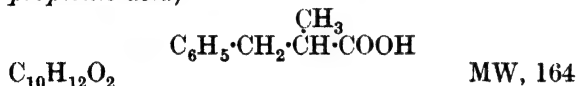
p-Methylhydrocinnamaldehyde (2-p-Tolylpropionaldehyde).

Oil. B.p. 220–30°, 122°/15 mm. D_4^{14} 0.999. n_D^{14} 1.525. Oxidises easily in air.

Semicarbazone: needles. M.p. 174° (170–1°). Spar. sol. cold EtOH.

See previous reference and also Auwers, *Ber.*, 1906, 39, 3758.

α-Methylhydrocinnamic Acid (2-Phenylisobutyric acid, methylbenzylacetic acid, 1-benzylpropionic acid)



d.
Oil. B.p. 160°/13 mm. D_4^{20} 1.065. $[\alpha]_D$ + 27.06° in C_6H_6 , + 27.72° in CHCl_3 .
Na salt: plates from MeOH–Et₂O. $[\alpha]_D$ + 35.93° in H_2O .

Chloride: $\text{C}_{10}\text{H}_{11}\text{OCl}$. MW, 182.5. B.p. 120–1°/15 mm., 111°/11 mm. D_4^{20} 1.102. $[\alpha]_D$ + 26.28°.

1-Menthylamide: $\text{C}_{20}\text{H}_{31}\text{ON}$. MW, 301. Needles from C_6H_6 . M.p. 140°. $[\alpha]_D$ + 7.5° in CHCl_3 .

Benzylanilide: $\text{C}_{23}\text{H}_{23}\text{ON}$. MW, 329. Cryst. M.p. 69–70°. $[\alpha]_D$ + 8.8° in CHCl_3 .

l.
Not obtained pure.

dl.
Plates from EtOH.Aq. M.p. 37.5°. B.p. 272–3°, 160°/12 mm. Very sol. EtOH, Et₂O, hot H₂O.

Me ester: $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. B.p. 232°.
Et ester: $\text{C}_{12}\text{H}_{16}\text{O}_2$. MW, 192. B.p. 142–3°/20 mm.

Chloride: $\text{C}_{10}\text{H}_{11}\text{OCl}$. MW, 182.5. B.p. 121°/17 mm.

Amide: $\text{C}_{10}\text{H}_{13}\text{ON}$. MW, 163. Needles from EtOH.Aq. M.p. 130°.

Methylanilide: prisms from pet. ether. M.p. 54–5°.

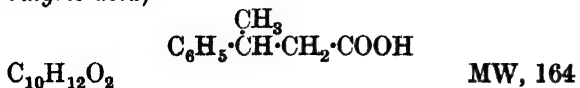
Benzylanilide: prisms from EtOH.Aq. M.p. 69–70°.

Pickard, Yates, *J. Chem. Soc.*, 1909, 95, 1019.

Kipping, Salway, *J. Chem. Soc.*, 1904, 85, 445.

Rupe, Busolt, *Ann.*, 1909, 369, 321.

β-Methylhydrocinnamic Acid (2-Phenylbutyric acid)



d.
B.p. 135°/4 mm. $[\alpha]_D^{26}$ + 0.96°.

l.
Oil. B.p. 157.25–157.75°/12 mm., 134°/4 mm., 127°/1 mm. D_4^{26} 1.066. n_D^{26} 1.5138. $[\alpha]_D^{26}$ – 57.23° in C_6H_6 , – 26.59° in EtOH.

Et ester: $\text{C}_{12}\text{H}_{16}\text{O}_2$. MW, 192. B.p. 111°/4 mm. D_4^{26} 0.996. n_D^{26} 1.4918. $[\alpha]_D^{26}$ – 9.15°.

1-Menthyl ester: prisms from MeOH. M.p. 47–8°. $[\alpha]_D^{20}$ – 76.26° in C_6H_6 .

dl.
Needles from H₂O, prisms from pet. ether, plates from ligroin. M.p. 47° (39–40°). B.p. about 270°, 168–9°/14 mm., 140–5°/3 mm. Sol. hot pet. ether. Spar. sol. hot H₂O.

Me ester: $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. B.p. 133–4°/22 mm.

Et ester: $\text{C}_{12}\text{H}_{16}\text{O}_2$. MW, 192. B.p. 118°/9 mm.

Chloride: $\text{C}_{10}\text{H}_{11}\text{OCl}$. MW, 182.5. Oil. B.p. 114°/11 mm.

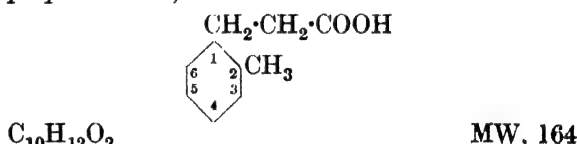
Amide: $\text{C}_{10}\text{H}_{13}\text{ON}$. MW, 163. Needles from EtOH.Aq. M.p. 106–7° (98.5°).

v. Braun, Grabowski, Kirschbaum, *Ber.*, 1913, 46, 1280.

Levene, Marker, *J. Biol. Chem.*, 1931, 93, 749.

See also last reference above.

o-Methylhydrocinnamic Acid (2-o-Tolylpropionic acid)



Prisms from EtOH.Aq. M.p. 102°. Sol. most org. solvents. Mod. sol. hot H₂O. Conc. H₂SO₄ → 4-methyl-1-hydrindone.

Young, *Ber.*, 1892, 25, 2104.

m-Methylhydrocinnamic Acid (2-m-Tolylpropionic acid).

Needles from ligroin. M.p. 42–3°. Sol. H₂O, EtOH, Et₂O. Conc. H₂SO₄ → 5- and 7-methyl-1-hydrindone.

v. Miller, Rohde, *Ber.*, 1890, 23, 1899.

p-Methylhydrocinnamic Acid (2-p-Tolylpropionic acid).

Plates from H₂O, needles from ligroin. M.p. 120° (116°). Sol. EtOH, C_6H_6 , pet. ether.

Et ester: $\text{C}_{12}\text{H}_{16}\text{O}_2$. MW, 192. Oil. B.p. 263–5°.

Amide: $C_{10}H_{13}ON$. MW, 163. Cryst. from H_2O . M.p. 135° (133°). Sol. EtOH, Et_2O . Spar. sol. cold H_2O .

Nitrile: $C_{10}H_{11}N$. MW, 145. B.p. $137^{\circ}/15$ mm.

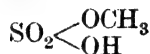
v. Miller, Rohde, *Ber.*, 1890, **23**, 1898.

Willgerodt, Hambrecht, *J. prakt. Chem.*, 1910, **81**, 77.

Methylhydrocotoin.

See under Cotoin.

Methyl hydrogen sulphate



CH_4O_4S MW, 112

Oil. Does not solidify at -30° . Very sol. H_2O . Less sol. EtOH.

NH_4 salt: plates. M.p. 135° .

Société anonyme des produits chimiques de Fontaines, D.R.P., 193,830, (*Chem. Zentr.*, 1908, I, 1112).

Methylhydroquinone.

See Toluhydroquinone.

1-Methylhydrosorbic Acid (1-Methyl-2-hexenic acid, 1-propylideneisobutyric acid, 1- α -butenylpropionic acid)



$C_7H_{12}O_2$ MW, 128

B.p. $122^{\circ}/24$ mm., $113.5^{\circ}/15$ mm. D_4^{20} 0.9353. n_D^{20} 1.4379.

Et ester: $C_9H_{16}O_2$. MW, 156. B.p. $78^{\circ}/25$ mm. D_4^{20} 0.8778. n_D^{20} 1.4237.

p-Bromophenacyl ester: needles from pet. ether. M.p. $41-2^{\circ}$.

Dibromide: cryst. from pet. ether. M.p. $107-8^{\circ}$.

Kon, Linstead, MacLennan, *J. Chem. Soc.*, 1932, 2453, 2458.

Auwers, Heyna, *Ann.*, 1923, **434**, 158.

2-Methylhydrosorbic Acid (2-Methyl-2-hexenic acid, 2-propylidene butyric acid)



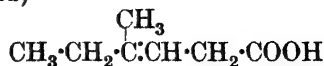
$C_7H_{12}O_2$ MW, 128

B.p. $113^{\circ}/10$ mm. D_4^{20} 0.95487. n_D^{20} 1.44692.

Et ester: $C_9H_{16}O_2$. MW, 156. B.p. $84-5^{\circ}/26$ mm. D_4^{20} 0.89609. n_D^{20} 1.43087.

Kon, Leton, Linstead, Parsons, *J. Chem. Soc.*, 1931, 1415.

3-Methylhydrosorbic Acid (3-Methyl-2-hexenic acid)



$C_7H_{12}O_2$ MW, 128

Liq. with unpleasant odour. B.p. $118^{\circ}/12$ mm. $D_4^{16.7}$ 0.9644. $n_D^{16.7}$ 1.4512. Unstable in air 2%. Aq. $KMnO_4 \rightarrow$ acetic acid + methyl ethyl ketone.

Et ester: $C_9H_{16}O_2$. MW, 156. B.p. $78^{\circ}/11$ mm.

Chloride: $C_7H_{11}OCl$. MW, 146.5. B.p. $65-8^{\circ}/15$ mm.

Anilide: $C_{13}H_{17}ON$. MW, 203. Needles from EtOH.Aq. M.p. 91° .

Linstead, Mann, *J. Chem. Soc.*, 1930, 2071.

4-Methylhydrosorbic Acid.

See 2-Isoheptenic Acid.

Methyl 2-hydroxy-*n*-amyl Ketone.

See 4-Heptanolone-2.

Methyl 4-hydroxy-*n*-amyl Ketone.

See 2-Heptanolone-6.

Methyl hydroxybutyl Ketone.

See Acetobutyl Alcohol, 2-Hexanolone-5, and 3-Hexanolone-5.

Methyl-hydroxyethylamine.

See 2-Methylaminoethyl Alcohol.

N-Methyl-N-2-hydroxyethylamine



$C_9H_{13}ON$ MW, 151

B.p. $218-19^{\circ}/110$ mm., $150^{\circ}/14$ mm. D^{20} 1.08065. Insol. H_2O . Oxidises easily. Reduces cold Au and Pt sols.

Benzoyl: cryst. from EtOH. M.p. $48-9^{\circ}$ (47°). B.p. $220^{\circ}/9$ mm. *Picrate*: cryst. M.p. 164° .

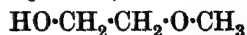
p-Nitrobenzoyl: yellow needles from EtOH. M.p. 70° . Spar. sol. EtOH. *Picrate*: m.p. 177° . Spar. sol. EtOH.

3:5-Dinitrobenzoyl: deep red cryst. from $CHCl_3$ -EtOH. M.p. 121° .

Gault, *Bull. soc. chim.*, 1908, **3**, 373.

v. Braun, Kirschbaum, *Ber.*, 1919, **52**, 1720, 2013.

Methyl 2-hydroxyethyl Ether (Ethylene glycol monomethyl ether)



$C_3H_8O_2$ MW, 76

B.p. $124.9^{\circ}/767$ mm. D_4^{20} 0.9647, D_{15}^{15} 0.96928. n_D 1.40238. Misc. with H_2O , Et_2O , C_6H_6 .

**N-Methyl-N-[2-hydroxyethyl]-guan-
idine**

Acetyl: b.p. 145°/762 mm. D_4^{20} 1.0090. Sol. H_2O .

Palomaa, *Ber.*, 1909, 42, 3874.

**N-Methyl-N-[2-hydroxyethyl]-guan-
idine.**

See Creatinol.

Methyl 1-hydroxyethyl Ketone.

See Acetoin.

Methyl 2-hydroxyethyl Ketone.

See 3-Keto-*n*-butyl Alcohol.

Methyl-hydroxyisopropyl-cyclohexane.

See Menthanol.

Methyl-hydroxyisopropyl-cyclohexanol.

See Menthandiol.

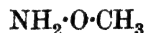
Methyl-hydroxyisopropyl-cyclohexene.

See Menthenol.

**Methyl-hydroxyisopropyl-cyclohexen-
one.**

See Δ^1 -*p*-8-Menthenolone-6.

O-Methylhydroxylamine (α -Methylhydr-
oxylamine, methoxylamine, hydroxylamine methyl
ether)



CH_5ON MW, 47

B.p. 49–50°. Reduces cold $NH_3 \cdot AgNO_3$ but
not Fehling's.

B, HCl: prisms. M.p. 149°.

$B_2H_2SO_4$: plates from EtOH.Aq. M.p.
144°.

B, HNO_3 : cryst. Detonates violently at
300°.

Picrate: m.p. 175°.

Traube, Ohlendorf, Zander, *Ber.*, 1920,
53, 1477.

N-Methylhydroxylamine (β -Methylhydr-
oxylamine, hydroxylaminomethane)



CH_5ON MW, 47

Prisms. M.p. 42° (rapid heat.). B.p. 62.5°/
15 mm. Very sol. H_2O , MeOH, EtOH. Spar.
sol. Et_2O , C_6H_6 , ligroin. D_4^{20} 1.0003. n_D^{20}
1.41638. Hygroscopic. Gradually decomp. on
standing. Fehling's $\rightarrow CO_2 + NH_3$ + methyl-
amine. $FeCl_3 \rightarrow$ reddish-violet col.

B, HCl: prisms. M.p. 88–90°. Sol. H_2O ,
EtOH. Volatile.

B, HBr: needles. M.p. 73°. Hygroscopic.

$B_2H_2SO_4$: m.p. 130°.

Oxalate: m.p. 159°.

Picrate: yellow plates from H_2O . M.p. 268°
(128–30°). Sol. H_2O , EtOH.

Me ether: *O*: *N*-dimethylhydroxylamine.
 C_2H_7ON . MW, 61. B.p. 42.2–42.6°. Sweet
odour. Does not reduce Fehling's. *B, HCl*:

740 Methyl-m-hydroxyphenylethyl-amine

plates. M.p. 115–16°. $B_2H_2PtCl_6$: red
prisms. M.p. 180° decomp.

Et ether: *N*-methyl-*O*-ethylhydroxylamine.
 C_3H_9ON . MW, 75. B.p. 65–65.5°. Sweet
odour. *B, HCl*: needles from $CHCl_3$ - Et_2O .
M.p. 74–5°. Sol. boiling $CHCl_3$. $B_2H_2PtCl_6$:
orange powder. M.p. 170–1° decomp.

Kjellin, *Ber.*, 1893, 26, 2382.

Jones, *Am. Chem. J.*, 1907, 38, 257.

Traube, Schulz, *Ber.*, 1923, 56, 1856.

**Methyl m-hydroxy-p-methoxyphenyl-
ethyl Ketone.**

See Isozingerone.

Methyl-hydroxymethyl-acetylene.

See 3-Methylpropargyl Alcohol.

Methyl-hydroxymethyl-benzoic Acid.

See Hydroxymethyl-toluic Acid.

**α -Methyl- α -hydroxymethyl-diphenyl-
methane.**

See 1-Hydroxy-2:2-diphenylpropane.

Methyl-hydroxymethyl-indole.

See Methylindolylcarbinol.

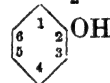
Methyl hydroxymethyl Ketone.

See Hydroxyacetone.

Methyl hydroxynaphthyl Ketone.

See Hydroxyacetone-naphthone.

Methyl-o-hydroxyphenylethyl-amine (2-
Hydroxyphenylethylmethylamine, α - β -methyl-
aminoethylphenol)



$C_9H_{13}ON$

MW, 151

B, HCl: plates from EtOH- Et_2O or Me_2CO -
 Et_2O . M.p. 148°. Spar. sol. Et_2O . $FeCl_3 \rightarrow$
dull violet col. Does not reduce $NH_3 \cdot AgNO_3$.

Me ether: α - β -methylaminoethylanisole.
 $C_{10}H_{15}ON$. MW, 165. *B, HCl*: plates from
EtOH- Et_2O . M.p. 119°. Sol. H_2O , EtOH.
Spar. sol. Et_2O . *B, HI*: prisms from EtOH-
 Et_2O . M.p. 101°. Sol. H_2O , EtOH.

Buck, *J. Am. Chem. Soc.*, 1932, 54, 3664.

Methyl-m-hydroxyphenylethyl-amine (3-
Hydroxyphenylethylmethylamine, *m*- β -methyl-
aminoethylphenol).

B, HCl: plates from EtOH- Et_2O or Me_2CO -
 Et_2O . M.p. 89°. Spar. sol. Et_2O . $FeCl_3 \rightarrow$
pale violet col. Does not reduce $NH_3 \cdot AgNO_3$.

Me ether: *m*- β -methylaminoethylanisole.
 $C_{10}H_{15}ON$. MW, 165. *B, HCl*: plates from
EtOH. M.p. 119°. Sol. H_2O , EtOH. Spar.

sol. Et₂O. *B, HI*: plates from EtOH-Et₂O. M.p. 108°. Sol. H₂O, EtOH.

See previous reference.

Methyl-*p*-hydroxyphenylethyl-amine (4-Hydroxyphenylethylmethylamine, *p*-β-methyl-aminoethylphenol).

Prisms from EtOH. M.p. 130°. B.p. 183-5°/9 mm. Mod. sol. H₂O. Sol. dil. acids and alkalis. Pptd. by excess NH₃. Reacts alkaline to phenolphthalein. Reduces cold acid KMnO₄. Gives intense Millon's reaction.

Me ether: *p*-β-methylaminoethylanisole. C₁₀H₁₅ON. MW, 165. *N-Acetyl*: cryst. B.p. 205-8°/18 mm.

N-Acetyl: plates from EtOH. M.p. 142°. Sol. MeOH, AcOEt.

B, HCl: plates from EtOH-Et₂O. M.p. 148-5°. Sol. H₂O.

B₂H₂PtCl₆: yellow needles. M.p. 205° decomp.

N-Benzenesulphonyl: leaflets from EtOH-Et₂O. M.p. 133-5°. Sol. H₂O.

Walpole, *J. Chem. Soc.*, 1910, 97, 942.

Methyl hydroxyphenyl Ketone.

See Hydroxyacetophenone.

Methyl hydroxyphenyl sulphide.

See under Thiohydroquinone and Thioresorcinol.

***N*-Methyl-3-hydroxypropyl-amine.**

See 3-Methylaminopropyl Alcohol.

Methyl 2-hydroxypropyl Ketone.

See Acetoisopropyl Alcohol.

Methyl 3-hydroxypropyl Ketone.

See 3-Acetopropyl Alcohol.

Methyl hydroxytolyl Ketone.

See Hydroxy-methylacetophenone.

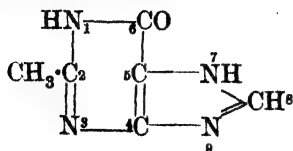
Methyl hypochlorite

CH₃OCl CH₃-OCl MW, 66.5

Liq. B.p. 12°/726 mm. Decomp. easily.

Sandmeyer, *Ber.*, 1886, 19, 859.

2-Methylhypoxanthine



C₆H₆ON₄ MW, 150

Cryst. Sol. 35 parts boiling H₂O, 100 parts cold H₂O. Forms cryst. salts.

Traube *et al.*, *Ann.*, 1923, 432, 288.

3-Methylhypoxanthine.

Cryst. Decomp. on heating. Sol. 210 parts H₂O. Sol. dil. min. acids. Forms cryst. salts with alkalis.

Traube, Winter, *Arch. Pharm.*, 1906, 244, 11.

7-Methylhypoxanthine.

Needles from EtOH. M.p. 335° decomp. Sol. hot H₂O. Very sol. dil. min. acids.

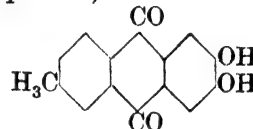
Fischer, *Ber.*, 1897, 30, 2409.

9-Methylhypoxanthine.

Plates from H₂O. M.p. 390° decomp. Sol. 40 parts boiling H₂O, 414 parts at 20°. Very sol. dil. alkalis.

Fischer, *Ber.*, 1898, 31, 114.

6-Methylhystazarin (6:7-Dihydroxy-2-methylantracquinone)



C₁₅H₁₀O₄ MW, 254

Yellow needles from EtOH. M.p. 320-40° decomp. Spar. sol. EtOH, AcOH. Sol. NH₃ with violet col., NaOH with greenish-blue col., conc. H₂SO₄ with cherry-red col. Zn dust dist. → 2-methylantracene.

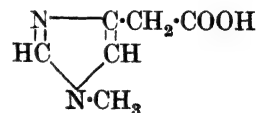
Diacetyl: yellowish needles from EtOH. M.p. 208°. Sol. EtOH, Me₂CO, AcOH.

Niementowski, *Ber.*, 1900, 33, 1633.

Methyliminazole.

See Methylglyoxaline.

1-Methyl-4-iminazolylacetic Acid (1-Methylglyoxaline-4-acetic acid, 1-methyliminazole-4-acetic acid)



C₆H₈O₂N₂ MW, 140

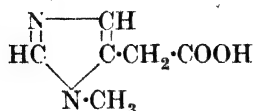
Et ester: C₈H₁₂O₂N₂. MW, 168. Brown oil. *Picrate*: yellow fibres from H₂O. M.p. 133-4°. Spar. sol. cold H₂O.

Nitrile: C₆H₇N₃. MW, 121. Plates from CHCl₃. M.p. 34-6°. Sol. H₂O and most org. solvents. Spar. sol. Et₂O, pet. ether. Very deliquescent. *Acid oxalate*: needles from H₂O or EtOH. M.p. 116-17°. Sol. H₂O. Spar. sol. EtOH. *Picrate*: pale yellow needles from H₂O. M.p. 209-10°. Spar. sol. cold H₂O.

Picrate: prisms from H₂O. M.p. 187-9°.

Pyman, *J. Chem. Soc.*, 1911, 99 2179.

1-Methyl-5-iminazolylacetic Acid (1-Methylglyoxaline-5-acetic acid, 1-methyliminazole-5-acetic acid)



$C_6H_8O_2N_2$ MW, 140

Nitrile: $C_6H_7N_3$. MW, 121. Oil. Sol. H_2O , EtOH, $CHCl_3$. *Acid oxalate*: prisms from EtOH. M.p. 139–40°. Sol. H_2O . Spar. sol. EtOH. *Picrate*: yellow leaflets from H_2O . M.p. 156–7°. Spar. sol. cold H_2O .

Picrate: plates from H_2O . M.p. 180–1°.

See previous reference.

Methyliminobutyric Acid.

See 2-Methylaminocrotonic Acid.

Methyliminodiacetic Acid (*Methyldiglycolamidic acid*)



$C_5H_8O_4N$ MW, 147

Cryst. from H_2O . M.p. 226–7° decomp. Sol. H_2O . Insol. EtOH, Et_2O .

Di-Me ester: $C_7H_{13}O_4N$. MW, 175. B.p. 126–128.5°/33–4 mm., 114.5–115.5°/13 mm.

Monoamide: $C_5H_{10}O_3N_2$. MW, 146. Needles from EtOH.Aq. M.p. 168°. Very sol. H_2O . Insol. EtOH, Et_2O .

Diamide: $C_5H_{11}O_2N_3$. MW, 145. Cryst. from MeOH. M.p. 168–9°. Sol. H_2O , MeOH, EtOH. Spar. sol. Et_2O , Me_2CO , C_6H_6 , $CHCl_3$, AcOEt, pet. ether. *B, HCl*: needles. M.p. 190–200° decomp. *B, HNO_3*: needles. De-comp. at 178–80°.

Dinitrile: $C_5H_7N_3$. MW, 109. B.p. 145–50°, 70°/45 mm.

Imide: see 4-Methyl-2:6-diketopiperazine.

Eschweiler, *Ann.*, 1894, 279, 39.

Franchimont, Dubsky, *Rec. trav. chim.*, 1916, 36, 95.

1-Methylindazole



$C_8H_8N_2$ MW, 132

Prisms from pet. ether. M.p. 60–1°. B.p. 231°, 109°/17 mm.

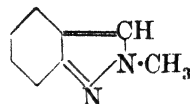
Picrate: yellow needles from EtOH. M.p. 136–7°.

Methiodide: cryst. from EtOH. M.p. 187°.

Picrate: orange needles from EtOH. M.p. 167–8°.

Auwers, Düesberg, *Ber.*, 1920, 53, 1198.

2-Methylindazole



$C_8H_8N_2$ MW, 132

Prisms and plates from pet. ether. M.p. 56°. B.p. 261°, 135°/16 mm. Sol. most org. solvents.

Picrate: yellow needles from EtOH. M.p. 168°.

Auwers, Düesberg, *Ber.*, 1920, 53, 1196.

3-Methylindazole.

Long needles from H_2O . M.p. 113°. B.p. 280–1°/736 mm. (277°). Sol. EtOH, Et_2O , $CHCl_3$. Mod. sol. hot H_2O . Insol. conc. NaOH. Volatile in steam. Does not reduce Fehling's.

B, HCl: needles from EtOH– Et_2O . M.p. 177°. Very sol. H_2O , EtOH.

Picrate: m.p. 198.5–199.5°.

Nitroso deriv.: yellow needles from ligroin. M.p. 60.5°. Very sol. EtOH, Et_2O , $CHCl_3$, AcOH. Sol. warm ligroin.

Fischer, Tafel, *Ann.*, 1885, 227, 317.

5-Methylindazole.

Needles from hot H_2O . M.p. 117°. B.p. 293–4°/747 mm. Sol. EtOH, Et_2O , AcOEt. Spar. sol. ligroin.

Acetyl: (i) *stable form*, plates and needles from pet. ether. M.p. 49°. Sol. Me_2CO , Et_2O , C_6H_6 , AcOH. Less sol. MeOH, EtOH. Spar. sol. pet. ether. (ii) *Labile form*: cryst. from Et_2O . M.p. 110–11°. Less sol. org. solvents than stable form.

Propionyl: (i) *stable form*, plates from pet. ether. M.p. 59–60°. Sol. Me_2CO , C_6H_6 , AcOH. Less sol. MeOH, EtOH. Spar. sol. cold pet. ether. (ii) *Labile form*: cryst. from Et_2O . M.p. 97–8°. Sol. Et_2O , AcOH. Less sol. MeOH, EtOH, C_6H_6 , pet. ether.

Benzoyl: (i) *stable form*, needles from pet. ether. M.p. 89.5–90.5°. Very sol. Et_2O , Me_2CO . Sol. MeOH, EtOH, C_6H_6 , AcOH. Spar. sol. pet. ether. (ii) *Labile form*: cryst. from Et_2O . M.p. 120–1°. Sol. Me_2CO , Et_2O , C_6H_6 , AcOH. Less sol. MeOH, EtOH. Spar. sol. pet. ether.

Picrate: needles from H_2O . M.p. 169–70°.

Auwers, Schwegler, *Ber.*, 1920, 53, 1227.

6-Methylindazole.

Plates from H_2O . M.p. $177-8^\circ$. Sol. Et_2O , Me_2CO , AcOH . Spar. sol. hot H_2O , cold EtOH , C_6H_6 . Insol. pet. ether.

Acetyl: (i) *stable form*, thick oil. B.p. $146-7^\circ/16$ mm. (ii) *Labile form*: plates from Et_2O . M.p. $116-18^\circ$. Sol. Me_2CO , C_6H_6 . Less sol. Et_2O , AcOH . Spar. sol. EtOH . Almost insol. pet. ether.

Picrate: yellow needles from H_2O . M.p. $163.5-164.5^\circ$.

Auwers, Schwegler, *Ber.*, 1920, **53**, 1231.

7-Methylindazole.

Long needles from pet. ether. M.p. 138° . Volatile in steam. Sublimes.

1-*Acetyl*: needles from H_2O . M.p. $31-2^\circ$.

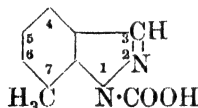
2-*Acetyl*: cryst. from pet. ether. M.p. $85-6^\circ$. Sol. most org. solvents.

1-*Chloroacetyl*: needles from EtOH . M.p. $93-4^\circ$. Sol. Et_2O , Me_2CO , C_6H_6 . Mod. sol. MeOH , EtOH , AcOEt . Spar. sol. pet. ether.

2-*Chloroacetyl*: needles from pet. ether. M.p. $125.5-126.5^\circ$. Sol. Me_2CO , C_6H_6 , AcOH . Less sol. EtOH , Et_2O .

Picrate: yellow needles from EtOH . M.p. 158° .

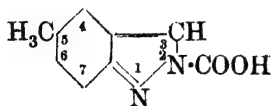
Auwers, Ernecke, Wolter, *Ann.*, 1930, **478**, 170.

7-Methylindazole-1-carboxylic Acid

$\text{C}_9\text{H}_8\text{O}_2\text{N}_2$ MW, 176

Me ester: $\text{C}_{10}\text{H}_{10}\text{O}_2\text{N}_2$. MW, 190. Needles from pet. ether. M.p. $59.5-60.5^\circ$. B.p. $166^\circ/13$ mm. Sol. most org. solvents.

Auwers, Ernecke, Wolter, *Ann.*, 1930, **478**, 172.

5-Methylindazole-2-carboxylic Acid

$\text{C}_9\text{H}_8\text{O}_2\text{N}_2$ MW, 176

Me ester: $\text{C}_{10}\text{H}_{10}\text{O}_2\text{N}_2$. MW, 190. Plates. M.p. $65-6^\circ$. Sol. most org. solvents.

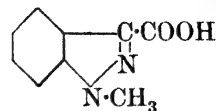
Et ester: $\text{C}_{11}\text{H}_{12}\text{O}_2\text{N}_2$. MW, 204. Needles from EtOH . Aq. M.p. $67-8^\circ$. Sol. most org. solvents.

Auwers, Lohr, *J. prakt. Chem.*, 1924, **108**, 308.

7-Methylindazole-2-carboxylic Acid.

Me ester: needles from pet. ether. M.p. $79-80^\circ$.

Auwers, Ernecke, Wolter, *Ann.*, 1930, **478**, 172.

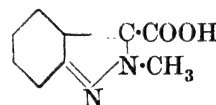
1-Methylindazole-3-carboxylic Acid

$\text{C}_9\text{H}_8\text{O}_2\text{N}_2$ MW, 176

Needles from 30% EtOH . M.p. $213-14^\circ$. Sol. most org. solvents. Spar. sol. pet. ether.

Me ester: $\text{C}_{10}\text{H}_{10}\text{O}_2\text{N}_2$. MW, 190. Needles from pet. ether. M.p. $75-7^\circ$. Sol. most org. solvents.

Auwers, Dereser, *Ber.*, 1919, **52**, 1346.

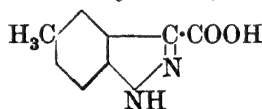
2-Methylindazole-3-carboxylic Acid

$\text{C}_9\text{H}_8\text{O}_2\text{N}_2$ MW, 176

Plates from EtOH . M.p. $224-5^\circ$ decomp. Sol. hot EtOH , Et_2O , Me_2CO , CHCl_3 , AcOH . Spar. sol. C_6H_6 . Insol. pet. ether.

Me ester: $\text{C}_{10}\text{H}_{10}\text{O}_2\text{N}_2$. MW, 190. Yellowish plates from pet. ether. M.p. $61-2^\circ$. Sol. most org. solvents.

See previous reference.

5-Methylindazole-3-carboxylic Acid (p-Methylindazole-carboxylic acid)

$\text{C}_9\text{H}_8\text{O}_2\text{N}_2$ MW, 176

Needles from hot AcOH . M.p. $285-6^\circ$ decomp. Heat above m.p. \rightarrow 5-methylindazole.

Schad, *Ber.*, 1893, **26**, 218.

2-Methylindene

$\text{C}_{10}\text{H}_{10}$ MW, 130

Oil. B.p. $184-5^\circ/741$ mm., $62-5^\circ/20$ mm. D_4^{20} 0.9897. n_D^{20} 1.5757. $\text{KMnO}_4 \rightarrow$ phthalic acid. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ orange-red ppt.

v. Braun, Kruber, Danziger, *Ber.*, 1916, **49**, 2652.

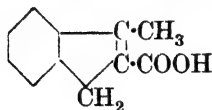
3-Methylindene (γ -Methylindene).

B.p. 198.5° (197–200°). D_4^{20} 0.9640. n_D^{27} 1.55907. Decomp. on standing in air.

Picrate: orange-yellow needles from EtOH. M.p. 76–8°. Very unstable.

Thiele, Bühner, *Ann.*, 1906, **347**, 266.

Wislicenus, Hentrich, *Ann.*, 1924, **436**, 19.

3-Methylindene-2-carboxylic Acid

$C_{11}H_{10}O_2$

MW, 174

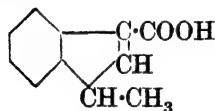
Needles from EtOH. M.p. 200°. Sol. Et₂O, hot EtOH. Insol. H₂O.

Me ester: $C_{12}H_{12}O_2$. MW, 188. Needles from MeOH. M.p. 78°. Sol. EtOH, Et₂O.

Et ester: $C_{13}H_{14}O_2$. MW, 202. Needles from EtOH. M.p. 37–9°. B.p. 164–5°/14 mm. $D_4^{28.6}$ 1.0745. $n_D^{39.1}$ 1.561.

Auwers, *Ann.*, 1918, **415**, 168.

Roser, *Ann.*, 1888, **247**, 157.

1-Methylindene-3-carboxylic Acid

$C_{11}H_{10}O_2$

MW, 174

Me ester: $C_{12}H_{12}O_2$. MW, 188. Yellow oil. B.p. 127°/14 mm. Hot alc. KOH \rightarrow 3-methylindene.

Et ester: $C_{13}H_{14}O_2$. MW, 202. B.p. 132–6°/16 mm.

Wislicenus, Mauthe, *Ann.*, 1924, **436**, 32.

Methylindenone.

See Methylindone.

1-Methylindole (N-Methylindole)

C_9H_9N

MW, 131

Yellow oil. Does not solidify at –20°. B.p. 240–1°/720 mm. (239°). Sol. EtOH, Et₂O, C₆H₆. Insol. H₂O. D_4^{20} 1.0707. Volatile in steam.

Picrate: red prisms from Et₂O. M.p. 150°. Very sol. hot C₆H₆. Less sol. Et₂O.

Fischer, Hess, *Ber.*, 1884, **17**, 562.

Carrasco, Padoa, *Atti accad. Lincei*, 1906, **15**, II, 729.

2-Methylindole (Methylketole, α -methylindole).

Found in coal tar. Needles from hot H₂O, plates from EtOH.Aq. M.p. 61°. B.p. 271–2°. Sol. EtOH, Et₂O. Spar. sol. hot H₂O. Heat of comb. C_v = 1167.9 Cal. Triboluminescent. Sols. in EtOH, Et₂O, C₆H₆, CHCl₃ fluor. violet to bluish-green in daylight. Heat in sealed tube \rightarrow quinoline. Alk. KMnO₄ \rightarrow acetyl-anthranilic acid. Decomp. on heating with conc. HCl.

N-Formyl: 2-methylindole-N-aldehyde. $C_{10}H_9ON$, MW, 159. Plates m.p. 75–6°. B.p. 155°/15 mm. D_4^{18} 1.1353. n_D^{15} 1.6170. Sol. conc. alkalis.

N-Acetyl: b.p. 200–10°/40 mm.

B.HClO₄: prisms. Decomp. at 170°.

B₂H₅SnCl₅: m.p. 207°.

Picrate: brownish-red needles. M.p. 139°.

Picryl chloride deriv.: red needles from EtOH. M.p. 115–16°.

B₂C₆H₅(NO₂)₃-1:3:5: red needles from EtOH. M.p. 152°.

Trinitrotoluene add. comp.: yellow needles from EtOH. M.p. 110°.

Trinitroaniline add. comp.: brick-red needles from EtOH. M.p. 166°.

Ciusa, Vecchiotti, *Atti accad. Lincei*, 1912, **21**, II, 161.

Verley, *Bull. soc. chim.*, 1924, **35**, 1039.

Kruber, *Ber.*, 1926, **59**, 2760.

I.C.I., E.P., 330,332, (*Chem. Abstracts*, 1930, **24**, 5770).

Alessandri, Passerini, *Gazz. chim. ital.*, 1921, **51**, i, 262; *Ber.*, 1927, **60**, 807.

3-Methylindole.

See Skatole.

4-Methylindole.

Found in coal tar. M.p. 5°. B.p. 267°. D_4^{20} 1.062. Resinifies with cold 2.5% HCl.

Picrate: red needles from EtOH. M.p. 194–5°.

Kruber, *Ber.*, 1929, **62**, 2877.

5-Methylindole.

Found in coal tar. Needles from H₂O. M.p. 60° (58.5°). B.p. 267°. Sol. hot H₂O, EtOH, Et₂O, C₆H₆, ligroin. Volatile in steam.

Picrate: red needles from H₂O. M.p. 151°.

Kruber, *Ber.*, 1926, **59**, 2759.

Robson, *J. Biol. Chem.*, 1924, **62**, 506.

7-Methylindole.

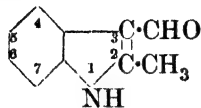
Found in coal tar. Plates from ligroin. M.p. 85°. B.p. 266°.

2-Methylindole-3-aldehyde

N-Benzoyl: needles from EtOH. M.p. 84°.
Picrate: red needles from EtOH. M.p. 176°.
Spar. sol. EtOH.

Kruber, *Ber.*, 1926, 59, 2753.

2-Methylindole-3-aldehyde



$C_{10}H_9ON$

MW, 159

Needles from AcOEt. M.p. 198°. Sol. H_2O , EtOH, Et_2O , conc. KOH. Gives faint red col. with pine chip + HCl. Boiling dil. H_2SO_4 → yellow → red col. Does not reduce Fehling's.

N-Me: $C_{11}H_{11}ON$. MW, 173. Cryst. from MeOH. M.p. 129°. *Oxime*: needles. M.p. 171°.

Phenylhydrazone: needles. M.p. 154° decomp.

Oxime: needles. M.p. 156–7° (154°).

Semicarbazone: m.p. 224° decomp.

Phenylhydrazone: needles. M.p. 201°.

p-Nitrophenylhydrazone: m.p. 273°.

Picrate: m.p. 181° decomp.

Angeli, Alessandri, *Atti accad. Lincei*, 1914, 23, II, 93.

König, *J. prakt. Chem.*, 1911, 84, 213.

Plancher, Ponti, *Atti accad. Lincei*, 1907, 16, I, 130.

5-Methylindole-3-aldehyde.

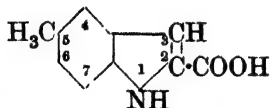
Cryst. from EtOH. M.p. 151° (148°).

Robson, *J. Biol. Chem.*, 1924, 62, 507.

3-Methylindole-carboxylic Acid.

See Skatole-carboxylic Acid.

5-Methylindole-2-carboxylic Acid



$C_{10}H_9O_2N$

MW, 175

Cryst. M.p. 229–30°. Dist. → 5-methylindole.

Et ester: $C_{12}H_{13}O_2N$. MW, 203. Cryst. M.p. 163°. B.p. 236°/4 mm.

Kruber, *Ber.*, 1926, 59, 2760.

Robson, *J. Biol. Chem.*, 1924, 62, 505.

6-Methylindole-2-carboxylic Acid.

Needles from H_2O . M.p. 217°.

Reissert, *Ber.*, 1897, 30, 1051.

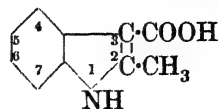
7-Methylindole-2-carboxylic Acid.

Needles from H_2O . M.p. 170°.

Kruber, *Ber.*, 1926, 59, 2758.

745 1-Methylindole-2:3-dicarboxylic Acid

2-Methylindole-3-carboxylic Acid



$C_{10}H_9O_2N$

MW, 175

Prisms from Me_2CO . Aq. M.p. 190° (176°) decomp. Sol. EtOH, Me_2CO , AcOEt. Spar. sol. H_2O , C_6H_6 . Insol. ligroin.

Et ester: $C_{12}H_{13}O_2N$. MW, 203. Needles from EtOH. M.p. 134–5°.

Nitrile: $C_{10}H_8N_2$. MW, 156. Needles from EtOH. Aq. M.p. 209–10°. Sol. EtOH, Et_2O , $CHCl_3$. Mod. sol. hot H_2O . *N-Acetyl*: needles from EtOH. M.p. 116°.

Seka, *Ber.*, 1924, 57, 1870.

Kruber, *Ber.*, 1926, 59, 2760.

Houben, Fischer, *Ber.*, 1931, 64, 2640.

4-Methylindole-3-carboxylic Acid.

Cryst. from Me_2CO . M.p. 189° decomp. → 4-methylindole. Sol. hot EtOH, AcOH. Spar. sol. hot H_2O .

Kruber, *Ber.*, 1929, 62, 2878.

5-Methylindole-3-carboxylic Acid.

Cryst. from Me_2CO . Aq. M.p. 202° decomp. → 5-methylindole.

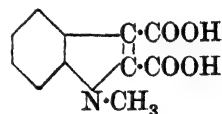
Kruber, *Ber.*, 1926, 59, 2759.

7-Methylindole-3-carboxylic Acid.

Prisms from Me_2CO . M.p. 228° decomp. → 7-methylindole. Sol. hot EtOH, AcOH. Spar. sol. H_2O .

See previous reference.

1-Methylindole-2:3-dicarboxylic Acid



$C_{11}H_9O_4N$

MW, 219

Prisms from EtOH. Aq. M.p. 218° decomp. → 1-methylindole. Sol. hot EtOH, Et_2O , C_6H_6 , ligroin. Spar. sol. cold H_2O .

Mono-Et ester: $C_{13}H_{15}O_4N$. MW, 247. Needles from EtOH. M.p. 158°. Sol. EtOH, C_6H_6 , $CHCl_3$. Spar. sol. Et_2O , pet. ether.

Di-Et ester: $C_{15}H_{17}O_4N$. MW, 275. Reddish-brown oil. Volatile in steam.

Dichloride: $C_{11}H_7O_2NCl_2$. MW, 256. Needles from C_6H_6 . M.p. about 82°. Easily decomp. by H_2O .

Monoamide: $C_{11}H_{10}O_3N_2$. MW, 218. Prisms. M.p. 204° decomp. *Et ester*: $C_{13}H_{14}O_3N_2$. MW,

246. Needles from C_6H_6 or pet. ether. M.p. 201° decomp.

Diamide: $C_{11}H_{11}O_2N_3$. MW, 217. Needles from hot H_2O . M.p. 267° decomp. Sol. 300 parts hot H_2O .

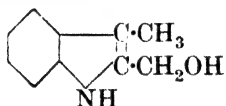
Anhydride: $C_{11}H_7O_3N$. MW, 201. Prisms from AcOEt. M.p. 212° . Sol. Me_2CO , C_6H_6 , $CHCl_3$, AcOEt. Spar. sol. Et_2O , pet. ether.

Reif, *Ber.*, 1909, **42**, 3036.

Methylindoline.

See Methylindihydroindole.

3-Methyl-2-indolylcarbinol (3-Methyl-2-hydroxymethylindole)



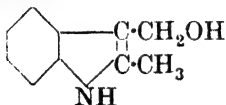
$C_{10}H_{11}ON$ MW, 161

Needles from C_6H_6 . M.p. 122° .

N-Acetyl: needles from pet. ether. M.p. $90-1^\circ$.

Plant, Tomlinson, *J. Chem. Soc.*, 1933, 958.

2-Methyl-3-indolylcarbinol (2-Methyl-3-hydroxymethylindole)



$C_{10}H_{11}ON$ MW, 161

Plates from EtOH.Aq. M.p. 225° . Insol. dil. HCl.

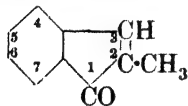
Diacetyl deriv.: cryst. from EtOH. M.p. 147° .

See previous reference and also Mingoa, *Gazz. chim. ital.*, 1932, **62**, 844.

Methyl 3-indolyl Ketone.

3-Acetoindole, *q.v.*

2-Methylindone (2-Methyl-2-indenone-1)



$C_{10}H_8O$ MW, 144

Yellow cryst. from EtOH.Aq. M.p. $47-47.5^\circ$. B.p. $119-20^\circ/16$ mm., $107-8^\circ/9$ mm. Sol. most org. solvents. Sol. conc. H_2SO_4 with blue col. Hot alkalis give blue sols from which acids ppt a polymer. $KMnO_4 \rightarrow$ phthalic acid.

Semicarbazone: yellow needles from EtOH.Aq. M.p. $192-3^\circ$ decomp.

p-Nitrophenylhydrazone: orange cryst. from AcOH. M.p. $195-7^\circ$.

p-Bromophenylhydrazone: orange cryst. from AcOH. M.p. 122° .

Stoermer, Voht, *Ann.*, 1915, **409**, 56.

Kizhner, *Chem. Abstracts*, 1934, **28**, 1692.

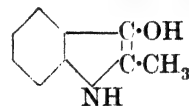
3-Methylindone (3-Methyl-2-indenone-1).

Yellow oil. B.p. $140-1^\circ/19$ mm.

Semicarbazone: yellow cryst. from amylalcohol. M.p. $208-16^\circ$ decomp.

Stoermer, Laage, *Ber.*, 1917, **50**, 983.

2-Methylindoxyl (3-Hydroxy-2-methylindole)



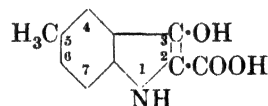
C_9H_9ON MW, 147

Cryst. M.p. 40° . Decomp. slowly to black sticky mass. Conc. HCl \rightarrow pink sol. which darkens on standing. $H_2SO_4 \rightarrow$ violet sol. Cold AcOH \rightarrow yellow sol. \rightarrow red on heating. Red sol. in $Ac_2O \rightarrow$ yellow on boiling.

Picrate: reddish cryst. M.p. 128° .

Ingraffia, *Gazz. chim. ital.*, 1933, **63**, 175.

5-Methylindoxyllic Acid (3-Hydroxy-5-methylindole-2-carboxylic acid)



$C_{10}H_9O_3N$ MW, 191

Et ester: $C_{12}H_{13}O_3N$. MW, 219. Cryst. M.p. $155-6^\circ$. Sol. EtOH, C_6H_6 . Insol. H_2O , ligroin. Heat with alkalis \rightarrow 5:5'-dimethylindigo.

Anhydride: yellow cryst. Sublimes. Conc. $H_2SO_4 \rightarrow$ green fluorescent sol.

Blank, *Ber.*, 1898, **31**, 1816; D.R.P., 109,416, (*Chem. Zentr.*, 1900, II, 406).

7-Methylindoxyllic Acid (7-Methyl-3-hydroxyindole-2-carboxylic acid).

Needles. M.p. 140° .

Cassella, D.R.P., 109,416, (*Chem. Zentr.*, 1900, II, 406).

Methylinositol.

See under Inositol.

Methyl iodide (Iodomethane)



CH_3I MW, 142

F.p. -66.45° . B.p. $42.50^\circ/760$ mm. D_4^{20} 2.3346, D_4^{25} 2.25102. n_D^{21} 1.5293, $n_{H_2O}^{15}$ yellow 1.534.

Heat of comb. C_p 194.7 Cal. Methylating agent. Combines with many tertiary bases to give well-characterised methiodides.

Hydrate : m.p. -4° .

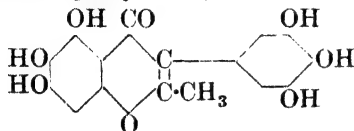
Timmermans, Delcourt, *J. chim. phys.*, 1934, **31**, 85.

King, *Organic Syntheses*, 1933, XIII, 60.

Methyl 2-iodoethyl Ether.

See under Ethylene iodohydrin.

2-Methylirigenol (5 : 6 : 7 : 3' : 4' : 5'-Hexahydroxy-2-methylisoflavone)



$C_{16}H_{13}O_8$

MW, 333

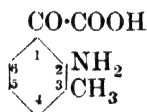
M.p. 325° decomp.

Hexa-Me ether : $C_{22}H_{25}O_8$. MW, 417. M.p. 166° .

6 : 7 : 3' : 4' : 5'-Penta-Me ether : $C_{21}H_{23}O_8$. MW, 403. M.p. $179-80^\circ$. Acetyl : m.p. $232-3^\circ$.

Baker, Robinson, *J. Chem. Soc.*, 1929, 152.

3-Methylisatic Acid (2-Amino-m-toluylic formic acid)



$C_9H_9O_3N$

MW, 179

Needles from AcOH. M.p. $239-40^\circ$.

N-Acetyl : needles from AcOH. M.p. 175° .

Heller, *Ber.*, 1922, **55**, 2697.

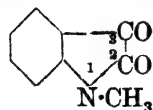
Posner, *Ber.*, 1926, **59**, 1823.

5-Methylisatic Acid (6-Amino-m-toluylic formic acid).

Yellow plates. M.p. 132° decomp. Sol. H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 . Sol. alkalis with yellow col. Above m.p. or on acidification \rightarrow 5-methylisatin.

Martinet, *Compt. rend.*, 1918, **166**, 953.

N-Methyl- ψ -isatin (N-Methylisatin)



$C_9H_7O_2N$

MW, 161

Reddish-yellow needles from H_2O . M.p. 134° . Dimorphous (both forms orthorhombic). Sol. MeOH, EtOH, Me_2CO , C_6H_6 , hot H_2O . Mod. sol. Et_2O . Stable in air.

2-Oxime : needles from H_2O . M.p. $189-92^\circ$ ($180-3^\circ$). Acetyl : yellow cryst. M.p. $154-5^\circ$.

3-Hydrazone : yellow needles from EtOH. M.p. $107-8^\circ$. B, HCl : m.p. 182° . Picrate : m.p. 112° .

3-Acetylhydrazone : yellow needles from EtOH. M.p. 143° .

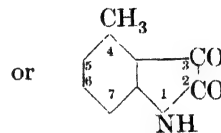
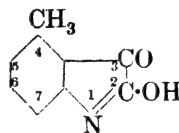
3-Phenylhydrazone : yellow needles from EtOH. M.p. $145-6^\circ$. Sol. hot EtOH, C_6H_6 . Spar. sol. Et_2O . Insol. ligroin.

2-Anil : yellowish-red prisms. M.p. 132° .

Borsche, Meyer, *Ber.*, 1921, **54**, 2851.

Colman, *Ann.*, 1888, **248**, 117.

4-Methylisatin



$C_9H_7O_2N$

MW, 161

Orange plates from EtOH. M.p. 189° .

Mayer, Schulze, *Ber.*, 1925, **58**, 1467.

5-Methylisatin (p-Methylisatin).

Red plates from H_2O . M.p. 187° . Spar. sol. cold H_2O .

N-Acetyl : yellow needles. M.p. 172° . Sol. C_6H_6 , $CHCl_3$. Spar. sol. H_2O , EtOH, Et_2O , CS_2 , ligroin.

N-Propionyl : plates. M.p. 143° . Sol. most org. solvents. Insol. H_2O .

N-Benzoyl : yellowish-green needles from C_6H_6 . M.p. 193° . Spar. sol. cold EtOH.

N-p-Toluenesulphonyl : m.p. $202-5^\circ$.

3-Phenylhydrazone : m.p. 268° .

2-[4-Methyl]-anil : brownish-violet needles from C_6H_6 . M.p. 180° . Sol. Me_2CO , C_6H_6 . Mod. sol. EtOH.

3-Anil : yellowish-red plates or prisms. M.p. $239-40^\circ$. Spar. sol. H_2O , cold EtOH.

3-[2-Methyl]-anil : red prisms from EtOH. M.p. 191° .

3-[4-Methyl]-anil : yellow needles and plates from EtOH. M.p. 259° . Sol. Et_2O . Spar. sol. cold EtOH. Insol. H_2O . N-Et : orange-red prisms. M.p. $151-2^\circ$. Sol. EtOH, C_6H_6 , $CHCl_3$, CS_2 , AcOH. Spar. sol. Et_2O , ligroin. Insol. H_2O . N-Acetyl : red needles. M.p. $121-2^\circ$. Sol. most org. solvents. Insol. H_2O .

3-[3-Bromo-4-methyl]-anil : red needles and prisms from EtOH. M.p. 210° .

Meyer, *Ber.*, 1883, **16**, 2265.

Duisberg, *Ber.*, 1885, **18**, 197.

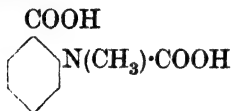
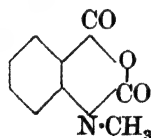
Bischler, Muntendam, *Ber.*, 1895, **28**, 731.

Wahl, Faivret, *Ann. chim.*, 1926, **5**, 323.

General Aniline Works, U.S.P., 1,856,210, (*Chem. Abstracts*, 1932, **26**, 3522).

6-Methylisatin.

Orange-red plates from EtOH. M.p. 147°.

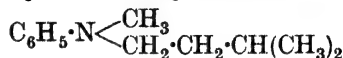
3-Methylanil: m.p. 65–7°.Mayer, Schulze, *Ber.*, 1925, **58**, 1467.**7-Methylisatin (o-Methylisatin).**Red cryst. from H₂O or EtOH. M.p. 267°. Sol. Py. Spar. sol. H₂O, EtOH, MeOH, Me₂CO, AcOH, amyl alcohol. Sublimes in red needles.**Monoxime**: yellow needles from EtOH. M.p. 235°. Sol. EtOH, Me₂CO, AcOH, AcOEt. Spar. sol. H₂O. Insol. C₆H₆.**Monophenylhydrazone**: yellow needles from EtOH–AcOH. M.p. 242°. Sol. most org. solvents.Bauer, *Ber.*, 1907, **40**, 2656.Wahl, Faivret, *Ann. chim.*, 1926, **5**, 323.General Aniline Works, U.S.P., 1,856,210, (*Chem. Abstracts*, 1932, **26**, 3522).**N-Methylisatoic Acid (N-Methyl-N-carboxyanthranilic acid)**C₉H₉O₄N MW, 195**Me ester**: C₁₀H₁₁O₄N. MW, 209. Cryst. from H₂O. M.p. 137–8°.**Et ester**: C₁₁H₁₃O₄N. MW, 223. Needles from H₂O. M.p. 118° (108°).**Anhydride**: see N-Methylisatoic Anhydride.Houben, *Ber.*, 1909, **42**, 3193.**N-Methylisatoic Anhydride**C₉H₇O₃N MW, 177

Yellow needles from EtOH. M.p. 180° (177°).

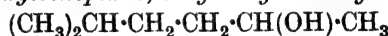
See previous reference and also

Heilbron, Kitchen, Parkes, Sutton, *J. Chem. Soc.*, 1925, **127**, 2171.**Methylisoamylacetic Acid.**

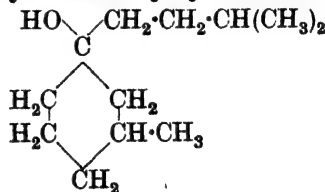
See 2-Methylhexane-5-carboxylic Acid.

MethylisoamylamineC₆H₁₅N MW, 101B.p. 108–10°/758.5 mm. D₄²⁰ 0.7428.**B₂HCl**: plates from Me₂CO. M.p. 181° (178°). Very sol. H₂O. Sol. EtOH, hot C₆H₆, CHCl₃. Insol. Et₂O.**B₂HBr**: needles. M.p. 183°. Sol. H₂O, EtOH.**B₂HAuCl₄**: cryst. M.p. 68–70°.**B₂H₂PtCl₆**: yellow needles from EtOH–Et₂O. M.p. 208–9° decomp.**N-Nitroso**: b.p. 204–5°.**Picrate**: m.p. 112°.Löffler, *Ber.*, 1910, **43**, 2043.Graymore, *J. Chem. Soc.*, 1932, 1356.**N-Methyl-N-isoamylaniline**C₁₂H₁₉N MW, 177B.p. 246–8°. D₂₀ 0.906. Insol. H₂O.**Picrate**: yellow prisms from EtOH. M.p. 93–4°. Sol. EtOH, C₆H₆.Thomas, Jones, *J. Chem. Soc.*, 1906, **89**, 294.Komatsu, *Chem. Zentr.*, 1913, **I**, 799.**Methylisoamylbenzene.**

See Isoamyltoluene.

Methylisoamylcarbinol (2-Methylhexanol-5, 5-hydroxyisoheptane, 5-hydroxy-2-methylhexane)C₇H₁₆O MW, 116B.p. 148–50°. D_{17.5}²⁰ 0.8185. CrO₃ → methyl isoamyl ketone.**Et ether**: C₉H₂₀O. MW, 144. B.p. 138–42°/740 mm.Späth, *Monatsh.*, 1914, **35**, 331.Rohn, *Ann.*, 1877, **190**, 309.**Methyl isoamyl Diketone.**

See Acetyliscaproyl.

3-Methyl-1-isoamylcyclohexanolC₁₂H₂₄O MW, 184Oil. B.p. 126–7°/20 mm. D₄²⁰ 0.8982, D₂₀²⁰ 0.8856. n_D²⁰ 1.464.**Acetyl**: b.p. 140°/20 mm. D₂₀²⁰ 0.9146. n_D²⁰ 1.457.**Phenylurethane**: m.p. 128°.Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1086.**Methyl isoamyl Ether**C₈H₁₈O MW, 102

B.p. 91–91.3° (90–1°). D_4^{20} 0.6871.

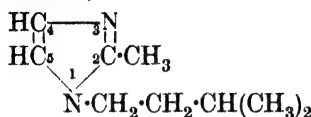
Riedel, D.R.P., 261,588, (*Chem. Zentr.*, 1913, II, 324).

Cerchez, *Bull. soc. chim.*, 1928, 43, 766.

Methylisoamylglyoxal.

See Acetylisoacaproyl.

2-Methyl-1-isoamylglyoxaline (2-Methyl-1-isoamyliminazole)



$C_9H_{16}N_2$ MW, 152

B.p. 242–3°.

Picrate: cryst. from EtOH. M.p. 148–9°. Sol. most org. solvents. Insol. H_2O .

Sarasin, Wegmann, *Helv. Chim. Acta*, 1924, 7, 723.

5-Methyl-4-isoamylglyoxaline (5-Methyl-4-isoamyliminazole).

Free base not isolated.

$B.HNO_3$: cryst. from EtOH. M.p. 131–2°.

$B.HAuCl_4$: yellow plates. M.p. 156°.

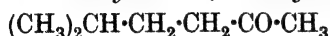
$B_2H_2PtCl_6$: yellow cryst. M.p. 191–2° decomp. Sol. EtOH. Spar. sol. H_2O .

Behr-Bregowski, *Ber.*, 1897, 30, 1520.

Methylisoamylglyoxime.

See under Acetylisoacaproyl.

Methyl isoamyl Ketone (2-Methylhexanone-5, 5-keto-2-methylhexane, isobutylacetone)



$C_7H_{14}O$ MW, 114

B.p. 144°/760 mm. D_4^{20} 0.8285, $D_4^{17.2}$ 0.8175.

Oxime: oil. B.p. 195–6°/761 mm. D_4^{20} 0.8881. n_D^{20} 1.4448.

Semicarbazone: cryst. from EtOH. M.p. 142–3°.

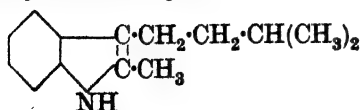
2:4-Dinitrophenylhydrazones: orange cryst. M.p. 95°.

Ketazine: b.p. 155–60°/45 mm., 134°/5 mm.

Popow, *Z. Chem.*, 1865, 578.

Locquin, Heilmann, *Bull. soc. chim.*, 1929, 45, 873 (Footnote).

2-Methyl-3-isoamylindole



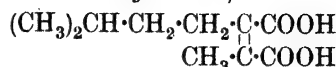
$C_{14}H_{18}N$ MW, 201

Red oil. B.p. 222–4°/60 mm.

Picrate: dark brown cryst. from EtOH. M.p. 147–9°.

Oddo, Alberti, *Gazz. chim. ital.*, 1933, 63, 236.

Methylisoamylmaleic Acid (6-Methyl-2-heptene-2:3-dicarboxylic acid)



$C_{10}H_{16}O_4$ MW, 200

Free acid not isolated.

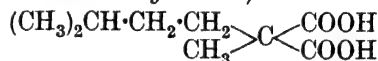
Di-Et ester: $C_{14}H_{24}O_4$. MW, 256. B.p. 163°/20 mm.

Anhydride: oil. B.p. 260–2°, 170°/50 mm., 142°/16 mm.

Anil: plates from EtOH.Aq. M.p. 70°. Sol. Et_2O , warm EtOH, C_6H_6 , pet. ether. Spar. sol. H_2O .

Auden, Perkin, Rose, *J. Chem. Soc.*, 1899, 75, 916.

Methylisoamylmalonic Acid (2-Methylhexane-5:5-dicarboxylic acid)



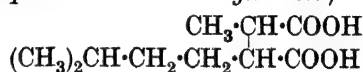
$C_9H_{16}O_4$ MW, 188

Cryst. from H_2O . M.p. 131–2°. Loses CO_2 above m.p.

Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 242–7°.

Sommaire, *Bull. soc. chim.*, 1923, 33, 193.

1-Methyl-2-isoamylsuccinic Acid (2-Methylheptane-5:6-dicarboxylic acid)



$C_{10}H_{18}O_4$ MW, 202

Exists in two forms:

(i) "Trans":

Prisms. M.p. 141–2°. Insol. ligroin. $k = 2.36 \times 10^{-4}$ at 25°.

(ii) "Cis":

M.p. 93°. Sol. ligroin. $k = 3.85 \times 10^{-4}$ at 25°. Volatile in steam.

Bone, Sprankling, *J. Chem. Soc.*, 1900, 77, 1304.

Auden, Perkin, Rose, *J. Chem. Soc.*, 1899, 75, 918.

Methyl isoamyl sulphide



$C_6H_{14}S$ MW, 118

B.p. 136–8°.

Obermeyer, *Ber.*, 1887, 20, 2925.

Methylisobutane.

See Tetramethylmethane.

Methylisobutylallylcarbinol (4 : 6 - Di-methyl-1-heptenol-4)
$$\text{(CH}_3\text{)}_2\text{CH}\cdot\text{CH}_2\cdot\overset{\text{CH}_3}{\underset{|}{\text{C}}}\text{(OH)}\cdot\text{CH}_2\cdot\text{CH}\cdot\text{CH}_2$$

$\text{C}_9\text{H}_{18}\text{O}$ MW, 142
 B.p. 180–2°/753 mm. (173°/765 mm.). Sol. EtOH, Et₂O. Insol. H₂O. D_4^{20} 0.8354, D_4^{21} 0.823. n_D^{19} 1.4443.

Bodroux, Taboury, *Compt. rend.*, 1909, **148**, 1677.Marko, *Chem. Zentr.*, 1904, II, 185.**Methylisobutylamine**

$$\text{(CH}_3\text{)}_2\text{CH}\cdot\text{CH}_2\cdot\text{NH}\cdot\text{CH}_3$$

$\text{C}_5\text{H}_{13}\text{N}$ MW, 87
 B.p. 76–8°.
B.HCl: m.p. 179°. Sol. H₂O, CHCl₃, hot C₆H₆. Insol. Et₂O.
B.HBr: needles from H₂O. M.p. 203°.
Picrate: yellow needles from EtOH. M.p. 103°.
N-Nitroso: b.p. 185–6°.

Graymore, *J. Chem. Soc.*, 1932, 1354.Stoerner, v. Lepel, *Ber.*, 1896, **29**, 2115.**N-Methyl-N-isobutylaniline**

$$\text{C}_6\text{H}_5\cdot\text{N}\begin{cases} \text{CH}_3 \\ \text{CH}_2\cdot\text{CH}(\text{CH}_3)_2 \end{cases}$$

$\text{C}_{11}\text{H}_{17}\text{N}$ MW, 163
 B.p. 227–8°.
B₂H₂PtCl₆: cryst. M.p. 180–4°.
Picrate: yellow plates from EtOH. M.p. 99–100°. Sol. hot EtOH, C₆H₆.
 Jones, *J. Chem. Soc.*, 1903, **83**, 1408.

Methylisobutylbenzene.

See Isobutyltoluene.

1-Methyl-4-isobutylbutadiene-1 : 3.

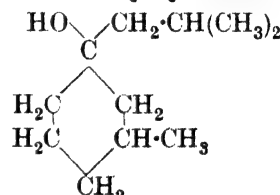
See 7-Methyloctadiene-2 : 4.

Methylisobutylcarbinol (4-Hydroxy-2-methylpentane, 2-methylpentanol-4)
$$\text{(CH}_3\text{)}_2\text{CH}\cdot\text{CH}_2\cdot\text{CH}(\text{OH})\cdot\text{CH}_3$$

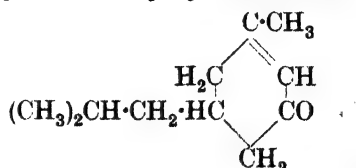
$\text{C}_6\text{H}_{14}\text{O}$ MW, 102
dl.
 B.p. 64°/60 mm. (65.5°/45 mm.). D_4^{19} 0.8083, D_4^{28} 0.8014, D_4^{50} 0.7824. n_D^{20} 1.4103, n_D^{25} 1.4100. $[\alpha]_D^{20} + 22.4^\circ$, $[\alpha]_D^{25} + 20.85^\circ$.
l.
 $[\alpha]_D^{14} - 20.80^\circ$.
1-Naphthylurethane: m.p. 86–9°. $[\alpha]_D^{22} - 3.7^\circ$ in EtOH.

dl.

B.p. 135–7° (131.85/760 mm., 130–1°/763 mm.), 50–5°/25 mm. D_0^0 0.8292 (0.8271, 0.8300), D_0^{17} 0.8183, D_4^{17} 0.8183, D_0^{20} 0.813, D_4^{25} 0.80245. n_D^{17} 1.40759, n_D^{20} 1.411, n_D^{25} 1.40895.
Et ether: $\text{C}_8\text{H}_{18}\text{O}$. MW, 130. B.p. 121–2°. D_0^0 0.7767, D_4^{18} 0.7612.
Acetyl: b.p. 147–8°. D_0^0 0.8805.
Phenylurethane: m.p. 143°.
Allophanate: m.p. 161°.

Clarke, Shreve, *Am. Chem. J.*, 1906, **35**, 515.Kerp, *Ann.*, 1896, **290**, 148.Skita, *Ber.*, 1908, **41**, 2939.Skita, Stuckart, *Ber.*, 1915, **48**, 1495.Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 56.Wanin, *Chem. Zentr.*, 1911, II, 194.Brunel, *J. Am. Chem. Soc.*, 1923, **45**, 1334.Levene, Mikeska, *J. Biol. Chem.*, 1925, **65**, 509.Guinot, U.S.P., 1,965,829, (*Chem. Abstracts*, 1934, **28**, 5475).Levene, Marker, *J. Biol. Chem.*, 1931, **90**, 673.**3-Methyl-1-isobutylcyclohexanol**

$\text{C}_{11}\text{H}_{22}\text{O}$ MW, 170
 Oil. B.p. 107–9°/20 mm. D_0^0 0.9011, D_4^{19} 0.8972. n_D 1.465.

Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1086.**1-Methyl-5-isobutylcyclohexenone-3**

$\text{C}_{11}\text{H}_{18}\text{O}$ MW, 166
 Oil. B.p. 146–8°/22 mm., 140–1°/15 mm., 130°/10 mm.

Oxime: needles from EtOH.Aq. M.p. 92–4°. Sol. acids and alkalis. *Benzoyl*: leaflets from EtOH.Aq. M.p. 138–40°.

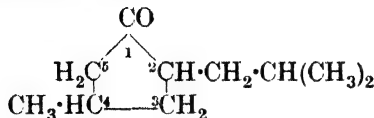
Semicarbazone: leaflets from EtOH. M.p. 163–7° decomp.

Thiosemicarbazone: m.p. 128–9° decomp.

Hydrazone: needles from EtOH. M.p. 149–51°.

Knoevenagel, *Ann.*, 1895, **288**, 336.

4-Methyl-2-isobutylcyclopentanone



$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

Liq. with peppermint-like odour. B.p. 196–7°. $[\alpha]_D + 62^\circ$ in Et_2O .

Oxime: needles from EtOH.Aq. M.p. 92°. Volatile in steam.

Semicarbazone: cryst. from EtOH. M.p. 163–4°. Sol. CHCl_3 , C_6H_6 . Insol. Et_2O , ligroin.

Dieckmann, *Ann.*, 1901, **317**, 85.

5-Methyl-2-isobutylcyclopentanone.

$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

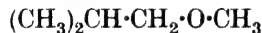
B.p. 82–3°/13 mm. $D_{15}^{25} 0.882$. $n_D^{25} 1.447$.

Cornubert, Borrel, *Bull. soc. chim.*, 1930, **47**, 301.

Methyl isobutyl Diketone.

See Acetylisovaleryl.

Methyl isobutyl Ether



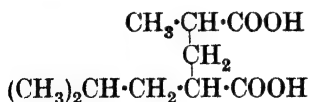
$\text{C}_5\text{H}_{12}\text{O}$ MW, 88

B.p. 59°/741 mm. (58°). $D_4^0 0.7523$, $D_4^{20} 0.7311$.

Rabcewicz-Lubkowsky, *J. prakt. Chem.*, 1912, **86**, 320.

Bennett, Philip, *J. Chem. Soc.*, 1928, 1930.

1-Methyl-3-isobutylglutaric Acid (2-Methylheptane-4 : 6-dicarboxylic acid)



$\text{C}_{10}\text{H}_{18}\text{O}_4$ MW, 202

Cis:

Cryst. from ligroin. M.p. 121°.

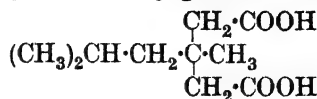
Anhydride: oil. B.p. 196°/50 mm., 178°/22 mm.

Trans:

Cryst. from ligroin. M.p. 86–7°. $\text{HCl} \rightarrow$ *cis* form.

Lawrence, *Proc. Chem. Soc.*, 1900, **16**, 154.

2-Methyl-2-isobutylglutaric Acid



$\text{C}_{10}\text{H}_{18}\text{O}_4$ MW, 202

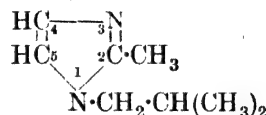
Cryst. M.p. 63–5°.

Guareschi, *Gazz. chim. ital.*, 1919, **49**, i, 129.

Methylisobutylglyoxal.

See Acetylisovaleryl.

2-Methyl-1-isobutylglyoxaline (2-Methyl-1-isobutyliminazole)



$\text{C}_8\text{H}_{14}\text{N}_2$ MW, 138

B.p. 225–6°.

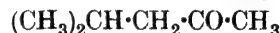
Picrate: cryst. from EtOH. M.p. 151–2°.

Sarasin, Wegmann, *Helv. Chim. Acta*, 1924, **7**, 722.

Methylisobutylglyoxime.

See under Acetylisovaleryl.

Methyl isobutyl Ketone (Isopropylacetone, 2-methylpentanone-4, 4-keto-2-methylpentane)



$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. 116.85°/760 mm., 115.5°/745 mm., 35–40°/16 mm. Misc. with EtOH, Et_2O , C_6H_6 . Insol. H_2O . $D_4^0 0.8195$, $D_4^{17.4} 0.80316$, $D_4^{20} 0.801$. $n_D^{17.4} 1.39694$, $n_D^{20} 1.396$. $\text{CrO}_3 \rightarrow$ acetic, isobutyric, and isovaleric acids. Forms bisulphite comp.

Oxime: b.p. 175°. $D_4^{17} 0.8935$. $n_D^{14} 1.456$.

Semicarbazone: m.p. 134° (132°).

2 : 4-Dinitrophenylhydrazones: m.p. 95°.

Grignard, *Ann. chim.*, 1902, **27**, 571.

Frankland, Duppa, *Ann.*, 1868, **145**, 82.

Salkind, Beburischwili, *Ber.*, 1909, **42**, 4502.

Skita, Stuckart, *Ber.*, 1914, **48**, 1494.

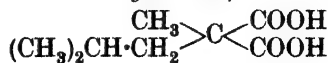
Law, *J. Chem. Soc.*, 1912, **101**, 1547.

Clarke, Shreve, *Am. Chem. J.*, 1906, **35**, 514.

Clarke, *J. Am. Chem. Soc.*, 1908, **30**, 1146.

Grignard, Fluchaire, *Ann. chim.*, 1928, **9**, 13.

Methylisobutylmalonic Acid (2-Methylpentane-4 : 4-dicarboxylic acid)



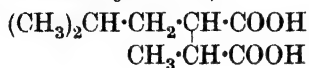
$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

Cryst. from H_2O . M.p. 122° . Very sol. H_2O .
Di-Et ester: $C_{11}H_{22}O_2$. MW, 186. B.p. $230-5^\circ$.

Burrows, Bentley, *J. Chem. Soc.*, 1895, 67, 510.

Tiffeneau, *Bull. soc. chim.*, 1923, 33, 186.

Methylisobutylsuccinic Acid (2-Methyl-hexane-4 : 5-dicarboxylic acid)



$C_9H_{16}O_4$ MW, 188

Cis :

M.p. $88-9^\circ$. Forms liq. anhydride.

Anil : m.p. $94-6^\circ$.

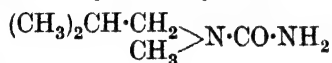
Trans :

M.p. 133° . Forms liq. anhydride.

Anil : m.p. $132-3^\circ$.

Bone, Sprankling, *J. Chem. Soc.*, 1900, 77, 1303.

unsym.-Methylisobutylurea

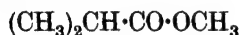


$C_6H_{14}ON_2$ MW, 130

Cryst. from C_6H_6 . M.p. $145-6^\circ$. Sol. H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 , ligroin.

Stoermer, v. Lepel, *Ber.*, 1896, 29, 2117.

Methyl isobutyrate



$C_5H_{10}O_2$ MW, 102

B.p. 93° . D_4^{20} 0.9112, D_4^{25} 0.8906, D_4^{30} 0.8049. Vap. press. at 0° 12.3 mm., at 10° 22.7 mm., at 20° 41 mm., at 35° 84 mm., at 42° 115 mm., at 55° 203.4 mm., at 70° 345 mm., at 84° 576 mm. Latent heat 79 cal. Heat of comb. C_p 716.94 Cal., C_v 694 Cal. Crit. temp. 267.55° . Crit. vol. 3320 c.c.s./gm.

Sabatier, Mailhe, *Compt. rend.*, 1912, 154, 176.

Methylisobutyrophenone.

See Isopropyl tolyl Ketone.

3-Methyl-2-isobutyrylfuran.

See Elscholtziane.

Methyl isocyanate



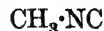
C_2H_3ON MW, 57

Liq. with powerful odour. B.p. $43-5^\circ$. Heat of comb. C_p 269.3 Cal., C_v 268.9 Cal. Polymerises to trimethylisocyanuric acid. $H_2O \rightarrow$ *unsym.*-dimethylurea. $KOH \rightarrow$ methyl-

amine + CO_2 . Condenses with cyanamide to give multiple products.

Gautier, *Ann. chim.*, 1869, 17, 229.

Methyl isocyanide (Methylcarbylamine, iso-acetonitrile, isocyanomethane)



C_2H_3N MW, 41

Liq. with odour resembling acetonitrile. M.p. -45° . B.p. 59.6° . D_4^{20} 0.7557. Sol. 15 parts H_2O . Burns with bluish-green flame. Heat of comb. C_p 318.7 Cal. Readily explodes. H_2O or alkalis \rightarrow methylamine + formic acid. $AcOH \rightarrow$ *N*-methylformamide + acetic anhydride. Extremely poisonous. Combines with many inorganic salts.

Gautier, *Ann. chim.*, 1869, 17, 215.

Methylisohexylcarbinol.

See 2-Methylheptanol-6.

Methyl isohexyl Ketone.

See Isoamylacetone.

Methyl isonitrosobutyl Ketone.

See under Acetylbutyryl.

Methyl isonitrosoethyl Ketone.

See under Diacetyl.

Methyl isonitrosohexyl Ketone.

See under Acetylcaproyl.

Methyl isonitrosoisoamyl Ketone.

See under Acetylisovaleryl.

Methyl isonitrosoisobutyl Ketone.

See under Acetylisobutyryl.

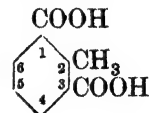
Methyl isonitrosopropyl Ketone.

See under Acetylpropionyl.

***N*-Methylisopelletierine.**

See under Isopelletierine.

2-Methylisophthalic Acid (Toluene-2 : 6-dicarboxylic acid)



$C_9H_8O_4$ MW, 180

M.p. $228-30^\circ$. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Graebe, Bossel, *Ann.*, 1896, 290, 213.

4-Methylisophthalic Acid (Toluene-2 : 4-dicarboxylic acid, β -xylylidinic acid).

Needles from hot H_2O . M.p. $320-30^\circ$. Sublimes. Sol. Et_2O . Spar. sol. EtOH, hot H_2O . Insol. cold H_2O .

Di-Me ester: $C_{11}H_{12}O_4$. MW, 208. Needles from MeOH. M.p. 80° . Sol. most org. solvents except MeOH, EtOH.

Dinitrile: $C_9H_6N_2$. MW, 142. Needles from EtOH.Aq. M.p. 144–5°. Volatile in steam.

Bentley, Perkin, *J. Chem. Soc.*, 1897, **71**, 176.

Claus, *J. prakt. Chem.*, 1890, **42**, 510.

Borsche, *Ann.*, 1912, **386**, 368.

5-Methylisophthalic Acid (*Toluene-3:5-dicarboxylic acid, witic acid*).

Needles from boiling H_2O . M.p. 298° (290°). Sol. EtOH, Et_2O , Me_2CO . Spar. sol. hot H_2O , $CHCl_3$, pet. ether. Insol. cold H_2O . $k = 3 \times 10^{-4}$ at 25°. Ox. \rightarrow trimesic acid. Heat with $CaCO_3 \rightarrow$ toluene. Heat Ca salt + $Ca(OH)_2 \rightarrow m$ -toluic acid.

Di-Me ester: $C_{11}H_{12}O_4$. MW, 208. Needles from EtOH.Aq. M.p. 98°.

Di-Et ester: $C_{13}H_{16}O_4$. MW, 236. Cryst. M.p. 35°.

Schorger, *J. Am. Chem. Soc.*, 1917, **39**, 2676.

Fittig, Furtenbach, *Ann.*, 1868, **147**, 296.

Wolff, Heip, *Ann.*, 1899, **305**, 137, 151.

Methylisopropenylcarbinol (2-Methyl-1-butenol-3, 3-hydroxy-2-methyl-2-butylene)

$CH_3 \cdot CH(OH) \cdot \overset{\overset{CH_3}{|}}{C} : CH_2$
 $C_5H_{10}O$ MW, 86

B.p. 115–17°. D_0 0.8571, D_{20}^{20} 0.8419. Spar. sol. H_2O . H_2SO_4 isomerises to methyl isopropyl ketone.

Kondakow, *J. Russ. Phys.-Chem. Soc.*, 1885, **17**, 296.

Bayer, D.R.P., 233,519, (*Chem. Zentr.*, 1911, I, 1333).

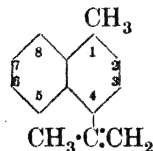
Methylisopropenylcyclohexane.

See $\Delta^8,9$ -*m*-Menthene and $\Delta^8,9$ -*p*-Menthene.

Methylisopropenylcyclohexene.

See Menthadiene and references thereunder.

1-Methyl-4-isopropenylnaphthalene



$C_{14}H_{14}$ MW, 182

Picrate: orange needles from EtOH. M.p. 88°.

Barnett, Cook, *J. Chem. Soc.*, 1933, 22.

Dict. of Org. Comp.—II.

1-Methyl-7-isopropenylnaphthalene.

$C_{14}H_{14}$ MW, 182

Picrate: cryst. from EtOH. M.p. 87–8°.

Ruzicka, v. Melsen, *Helv. Chim. Acta*, 1931, **14**, 410.

Methylisopropylacetaldehyde.

See 1-Methylisovaleraldehyde.

Methylisopropylacetamide (N-Acetyl-methylisopropylamine)

$CH_3 \cdot CO \cdot N \begin{matrix} \swarrow CH_3 \\ \searrow CH(CH_3)_2 \end{matrix}$
 $C_6H_{13}ON$ MW, 115

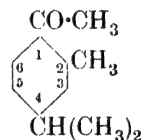
B.p. 69–70°/13 mm.

v. Braun, Jostes, Wagner, *Ber.*, 1928, **61**, 1428.

Methylisopropylacetic Acid.

See 1:2-Dimethylbutyric Acid.

2-Methyl-4-isopropylacetophenone (6-Aceto-*m*-cymene)



$C_{12}H_{16}O$ MW, 176

B.p. 125°/12 mm. D_0 0.9833, D_{20}^{20} 0.9694. n_D^{20} 1.5246.

Semicarbazone: m.p. 171°.

Oxime: m.p. 93–4°.

Lacourt, *Bull. soc. chim. Belg.*, 1930, **39**, 132.

2-Methyl-5-isopropylacetophenone (2-Aceto-*p*-cymene).

B.p. 249–50° (244°, 240°), 142°/37 mm., 139°/19 mm., 124–5°/12 mm. D_0 0.9713, D_{16}^{16} 0.9715, D_4^{20} 0.956. Ox. \rightarrow 4-methylisophthalic acid. $FeCl_3 \rightarrow$ red col.

Claus, *J. prakt. Chem.*, 1890, **42**, 568.

Klages, Lickroth, *Ber.*, 1899, **32**, 1563.

Allen, *Organic Syntheses*, 1934, XIV, 1.

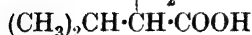
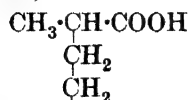
Methylisopropylacetylene (4-Methyl-pentine-2)

$(CH_3)_2CH \cdot C : C \cdot CH_3$
 C_6H_{10} MW, 82

B.p. 71–2°. D_0 0.7321.

Ipatjew, *J. Russ. Phys.-Chem. Soc.*, 1895, **27**, 404.

1-Methyl-4-isopropyladipic Acid (2-Methylheptane-3:6-dicarboxylic acid, iso-octane-3:6-dicarboxylic acid)


 $\text{C}_{10}\text{H}_{18}\text{O}_4$

MW, 202

Active form:

Cryst. M.p. 105–6°. B.p. 218–20°/18 mm.

Di-Me ester: $\text{C}_{12}\text{H}_{22}\text{O}_4$. MW, 230. B.p. about 251° part. decomp., 143–4°/22 mm. D_{18}^{25} 0.9938. $[\alpha]_D$ about +8° 30'.

Di-Et ester: $\text{C}_{14}\text{H}_{26}\text{O}_4$. MW, 258. B.p. 158°/19 mm. D_{18}^{25} 0.9653.

Dichloride: $\text{C}_{10}\text{H}_{16}\text{O}_2\text{Cl}_2$. MW, 239. B.p. 247–8°/25 mm. Unstable.

Diamide: $\text{C}_{10}\text{H}_{20}\text{O}_2\text{N}_2$. MW, 200. Needles. M.p. 242°. Insol. Et_2O , cold EtOH.

Inactive form:

Cryst. from C_6H_6 . M.p. 110–11° (103°). Very spar. sol. cold H_2O .

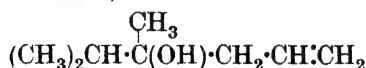
Di-Et ester: b.p. 144–6°/14 mm.

Martine, *Ann. chim. phys.*, 1904, **3**, 90.

Bouveault, Locquin, *Bull. soc. chim.*, 1908, **3**, 443, 447.

Blanc, *Bull. soc. chim.*, 1905, **33**, 909.

Methylisopropylallylcarbinol (4:5-Dimethyl-1-hexenol-4)


 $\text{C}_8\text{H}_{16}\text{O}$

MW, 128

B.p. 155–6° (151–3°). D_4^{20} 0.8509, D_{20}^{20} 0.85168. Insol. H_2O .

Schryver, *J. Chem. Soc.*, 1893, **63**, 1336.

Wagner, *Chem. Zentr.*, 1901, **I**, 668.

Methylisopropylamine


 $\text{C}_4\text{H}_{11}\text{N}$

MW, 73

B.p. 50°. D_4^{25} 0.7026.

B.HCl: needles. M.p. 77°. Sol. H_2O , EtOH. Insol. Et_2O . Hygroscopic.

Acetyl: see Methylisopropylacetamide.

Benzoyl: thick oil. B.p. 144°/13 mm.

Phenylurea: needles from EtOH. M.p. 131°.

Phenylthiourea: needles from EtOH-pet. ether. M.p. 120°.

B.HAuCl₄: cryst. M.p. 96–7°. Sol. EtOH. Spar. sol. cold H_2O .

B₂H₂PtCl₆: cryst. from H_2O . M.p. 184–9°. Sol. H_2O . Insol. EtOH, Et_2O .

Picrate: yellow needles from H_2O . M.p. 135° (133–4°).

Dunstan, Goulding, *J. Chem. Soc.*, 1901, **79**, 640.

v. Braun, Jostes, Wagner, *Ber.*, 1928, **61**, 1428.

N-Methyl-N-isopropylaniline


 $\text{C}_{10}\text{H}_{15}\text{N}$

MW, 149

Oil. B.p. 212–13°.

B₂H₂PtCl₆: yellow needles from EtOH. M.p. 196–7° (193–4°).

v. Braun, *Ber.*, 1900, **33**, 2732.

Thomas, Jones, *J. Chem. Soc.*, 1906, **89**, 287.

Methylisopropylaniline.

See *p*-Cymidine and Thymylamine.

2-Methyl-5-isopropylanisic Acid.

See under 6-Hydroxy-4-isopropyl-*m*-toluic Acid.

Methylisopropylbenzene.

See Cymene.

Methylisopropylbenzaldehyde.

See Isopropyltoluic Aldehyde.

Methylisopropylbenzoic Acid.

See Isopropyltoluic Acid.

N-Methyl-*p*-isopropylbenzylamine.

See *N*-Methylcumylamine.

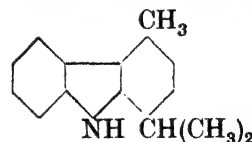
1-Methyl-4-isopropylbutadiene-1:3.

See 6-Methyl-2:4-heptadiene.

2-Methyl-4-isopropylbutadiene-1:3.

See 2:5-Dimethylhexadiene-1:3.

4-Methyl-1-isopropylcarbazole


 $\text{C}_{16}\text{H}_{17}\text{N}$

MW, 223

Cryst. M.p. 86°.

Picrate: yellowish-red needles. M.p. 152°.

Borsche, *Ann.*, 1908, **359**, 78.

Methylisopropylcarbinol (2-Methylbutanol-3, sec.-isoamyl alcohol)


 $\text{C}_5\text{H}_{12}\text{O}$

MW, 88

d-.

B.p. 110–12°. D_4^{25} 0.8225. n_D^{20} 1.3973. $[\alpha]_D^{25}$ +5.34° in EtOH.

Acetyl: b.p. 128.5–129°/758 mm. D_4^{25} 0.860. n_D^{25} 1.3932. $[\alpha]_D^{25}$ +3.64°.

Benzoyl: b.p. 83-4°/2 mm. D_4^{25} 0.979. n_D^{25} 1.4887. $[\alpha]_D^{25} + 9.26^\circ$.

dl.

B.p. 112.9-113.9°/760 mm. (110-111.5°).

Me ether: $C_6H_{14}O$. MW, 102. B.p. 81.2-81.5°/737 mm. D_4^{20} 0.7586. n_D^{20} 1.3850.

Chloroacetyl: b.p. 180-1°/738 mm. D_4^{20} 1.0418. n_D^{20} 1.4298.

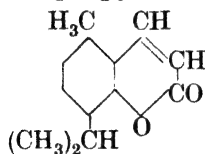
Pickard, Kenyon, *J. Chem. Soc.*, 1912, 101, 628.

Drake, Cooke, *Organic Syntheses*, 1932, XII, 48.

Gustus, Stevens, *J. Am. Chem. Soc.*, 1933, 55, 385.

Stevens, *ibid.*, 4239.

5-Methyl-8-isopropylcoumarin

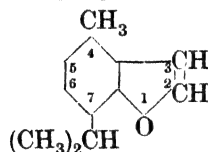


$C_{13}H_{14}O_2$ MW, 202

Needles. M.p. 53°. B.p. 220-30°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃, AcOH. Very spar. sol. H₂O.

v. Pechmann, Walsh, *Ber.*, 1884, 17, 1647.

4-Methyl-7-isopropylcoumarone



$C_{12}H_{14}O$ MW, 174

Oil. B.p. 241-2°. D^{16} 1.0145. n_D^{16} 1.5363. Conc. H₂SO₄ → yellow col. → pink on standing.

Stoermer, *Ann.*, 1900, 312, 306.

7-Methyl-4-isopropylcoumarone.

B.p. 238-40°. D^{17} 1.0166. n_D^{17} 1.5294. Warm conc. H₂SO₄ → reddish-brown col.

See previous reference.

Methylisopropylcyclohexadiene.

See Menthadiene and references thereunder.

Methylisopropylcyclohexandiol.

See Menthandiol.

Methylisopropylcyclohexane.

See Menthane.

Methylisopropylcyclohexanol.

See Menthanol and references thereunder.

Methylisopropylcyclohexanolone.

See Menthanolone.

Methylisopropylcyclohexanone.

See Menthanonone.

Methylisopropylcyclohexene.

See Menthene.

Methylisopropylcyclohexenol.

See Menthenol.

Methylisopropylcyclohexenone.

See Menthenone.

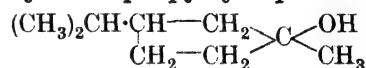
Methylisopropylcyclohexylamine.

See Menthylamine and Isomenthylamine.

Methylisopropylcyclopentane-carboxylic Acid.

See Fencholic Acid.

1-Methyl-3-isopropylcyclopentanol



$C_9H_{18}O$

MW, 142

l.

M.p. 76°. B.p. 185-7°. Very volatile. Sublimes in needles.

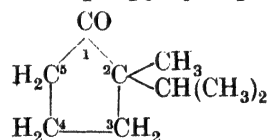
r.

M.p. 43-4°. B.p. 185-6°. Sublimes in needles.

Wallach, Challenger, *Ann.*, 1912, 388, 61.

Wallach, Oldenberg, *Ann.*, 1911, 379, 204.

2-Methyl-2-isopropylcyclopentanone



$C_9H_{18}O$

MW, 142

B.p. 97.5°/45 mm. $D^{16.5}$ 0.9067. $n_D^{16.5}$ 1.4495.

Semicarbazone: m.p. 170-2°.

Benzylidene deriv.: m.p. 61°. B.p. 208-9°/27 mm.

Cornubert, Borrel, *Bull. soc. chim.*, 1930, 47, 965.

4-Methyl-2-isopropylcyclopentanone.

Liq. with odour resembling menthone. B.p. 186-7°. D^{20} 0.8850. n_D^{20} 1.4392.

Oxime: m.p. 66°.

Semicarbazone: m.p. 182° (179°).

Wallach, *Ann.*, 1912, 394, 374.

5-Methyl-2-isopropylcyclopentanone (Dihydropulegone, dihydrocamphorophorone).

r.

B.p. 184-5°. D^{20} 0.889. n_D 1.4402.

Oxime: m.p. 71-2°.

Semicarbazone: m.p. 198-9°.

Wallach, *Ann.*, 1918, 414, 343.

Note. Several 5-methyl-2-isopropylcyclopentanones of unknown spacial configuration are described in the literature. *See*

Godchot, Taboury, *Bull. soc. chim.*, 1913, 13, 600.

Martine, *Ann. chim. phys.*, 1904, 3, 94.

Crossley, Perkin, *J. Chem. Soc.*, 1898, 73, 29.

Semmler, McKenzie, *Ber.*, 1906, 39, 1169.

5-Methyl-3-isopropylcyclopentanone.

B.p. 191–2°, 135–6°/143 mm. D_4^{20} 0.8862. n_D^{19} 1.4413.

Oxime: cryst. M.p. 93–4°.

Semicarbazone: m.p. 175–6° (150–1°).

Toivonen, *Chem. Abstracts*, 1929, 23, 1625.

Wallach, *Ann.*, 1918, 414, 362.

Methyl isopropyl Diketone.

See Acetylisobutyryl.

Methyl isopropyl Ether



$\text{C}_4\text{H}_{10}\text{O}$ MW, 74

B.p. 32.5°/777 mm. (32°). Spar. sol. H_2O . D_4^{20} 0.7383, D_4^{25} 0.7237. n_D^{20} 1.35756. Forms cryst. comp. with K_2CO_3 .

Henry, *Rec. trav. chim.*, 1904, 23, 326.

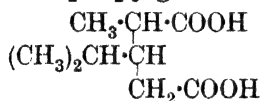
1-Methyl-1-isopropylethylene.

See 2:3-Dimethylbutylene-1.

1-Methyl-2-isopropylethylene.

See 4-Methyl-2-pentene.

1-Methyl-2-isopropylglutaric Acid



$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Cis:

Prisms from Et_2O or plates from H_2O . M.p. 137–8°. Spar. sol. cold H_2O , Et_2O . Insol. ligroin.

Anhydride: $\text{C}_9\text{H}_{14}\text{O}_3$. MW, 170. Plates from pet. ether. M.p. 44°.

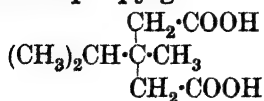
Imide: $\text{C}_9\text{H}_{15}\text{O}_2\text{N}$. MW, 169. Needles from H_2O . M.p. 114–15°.

Trans:

Cryst. from H_2O . M.p. 101°.

Howles, Thorpe, Udall, *J. Chem. Soc.*, 1900, 77, 946.

2-Methyl-2-isopropylglutaric Acid



$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188.

Plates from C_6H_6 . M.p. 100°.

Anhydride: $\text{C}_9\text{H}_{14}\text{O}_3$. MW, 170. Plates from pet. ether. M.p. 41–2°.

Kon, Thorpe, *J. Chem. Soc.*, 1919, 115, 702.

Methylisopropylglyoxal.

See Acetylisobutyryl.

Methylisopropylglyoxime.

See under Acetylisobutyryl.

sym.-Methylisopropylhydrazine



$\text{C}_4\text{H}_{12}\text{N}_2$ MW, 88

B.p. 100°.

Dibenzoyl: cryst. from Et_2O . M.p. 76–7°.

Ramsperger, *J. Am. Chem. Soc.*, 1929, 51, 918.

Methylisopropylidenecyclohexane.

See Menthene.

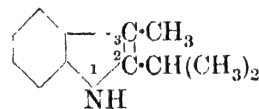
Methylisopropylidenecyclohexenol.

See Menthadienol.

Methylisopropylidenecyclopentane-carboxylic Acid.

See β -Fencholenic Acid.

3-Methyl-2-isopropylindole



$\text{C}_{12}\text{H}_{15}\text{N}$ MW, 173

Yellow cryst. B.p. 292°/750 mm., 175–7°/30 mm. Very sol. org. solvents.

Picrate: red needles. M.p. 165–6°. Very sol. boiling C_6H_6 .

Plancher, Bonavia, *Gazz. chim. ital.*, 1902, 32, ii, 421.

2-Methyl-3-isopropylindole.

Light yellow oil. B.p. 173°/15 mm.

Kuroda, *Chem. Zentr.*, 1923, III, 142.

Methyl isopropyl Ketone (2-Methylbutanone-3, 3-ketoisopentane, 2-acetopropane, 1:1-dimethylacetone)



$\text{C}_5\text{H}_{10}\text{O}$ MW, 86

B.p. 93–4°/752.5 mm. D_4^{16} 0.8046. n_D^{16} 1.38788.

Oxime: b.p. 157–8°.

Cyanhydrin: *see under* 1-Hydroxy-1:2-dimethylbutyric acid.

Semicarbazone: cryst. from EtOH . M.p. 114°.

Ketazine: b.p. 165°.

Di-Et acetal: 3:3-diethoxyisopentane.
 $C_9H_{20}O_2$. MW, 160. B.p. 52.4°/20 mm. D^{20}_D 0.8627, D^{20}_D 0.8453.

Semioxamazone: needles from EtOH. M.p. 143°.

p-Nitrophenylhydrazone: golden brown cryst. M.p. 103.5°.

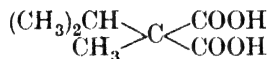
2:4-Dinitrophenylhydrazone: orange-yellow cryst. M.p. 117°.

Bardan, *Bull. soc. chim.*, 1931, **49**, 1875.

Whitmore, Evers, Rothrock, *Organic Syntheses*, 1933, XIII, 68.

I.G., E.P., 318,124, (*Chem. Abstracts*, 1930, **24**, 2140).

Methylisopropylmalonic Acid (3-Methylbutane-2:2-dicarboxylic acid, isopentane-3:3-dicarboxylic acid)



$C_7H_{12}O_4$ MW, 160

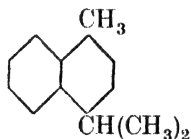
Cryst. from C_6H_6 . M.p. 124°. $k = 1.41 \times 10^{-3}$ at 25°.

Di-Et ester: $C_9H_{16}O_4$. MW, 216. B.p. 221°/752 mm. (217–22°). D^{15}_D 0.990.

v. Romburgh, *Rec. trav. chim.*, 1886, **5**, 236.

Perkin, *J. Chem. Soc.*, 1896, **69**, 1477.

1-Methyl-4-isopropyl-naphthalene



$C_{14}H_{16}$ MW, 184

B.p. 145–8°/12 mm., 135–45°/12 mm. D^{14}_D 0.9934. n^{14}_D 1.5907.

Picrate: orange-yellow needles from EtOH. M.p. 99–100°.

Styphnate: yellow needles from EtOH. M.p. 102°.

Rapson, Short, *J. Chem. Soc.*, 1933, 128.

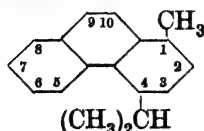
1-Methyl-7-isopropyl-naphthalene.

See Eudalene.

2-Methyl-8-isopropyl-naphthalene.

See Apocadalene, Addendum, Vol. I.

1-Methyl-4-isopropylphenanthrene



$C_{18}H_{18}$

MW, 234 $C_8H_{13}N$

Cryst. from MeOH.Aq. or EtOH.Aq. M.p. 68–68.5°.

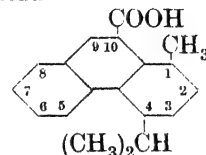
Picrate: orange needles from EtOH. M.p. 113.6–114°.

Bogert, Stamatoff, *Rec. trav. chim.*, 1933, **52**, 591.

1-Methyl-7-isopropylphenanthrene.

See Retene.

1-Methyl-4-isopropylphenanthrene-10-carboxylic Acid



$C_{19}H_{18}O_2$ MW, 278

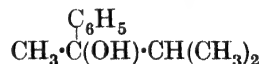
Needles from C_6H_6 or AcOH. M.p. 201–2°. Loses CO_2 at 320°.

Bogert, Stamatoff, *Rec. trav. chim.*, 1933, **52**, 584.

Methylisopropylphenol.

See Isopropylresol, Carvacrol, and Thymol.

Methylisopropylphenylcarbinol (2-Methyl-3-phenylbutanol-3, 3-methyl-2-phenyl-sec.-n-butyl alcohol)



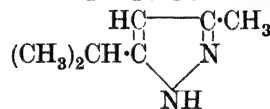
$C_{11}H_{16}O$ MW, 164

B.p. 196–8°, 118°/24 mm., 109–10°/12 mm. D^{13}_D 0.9653. n^{13}_D 1.51611.

Klages, *Ber.*, 1903, **36**, 3690.

Auwers, Eisenlohr, *J. prakt. Chem.*, 1910, **82**, 93.

3-Methyl-5-isopropylpyrazole



$C_7H_{12}N_2$ MW, 124

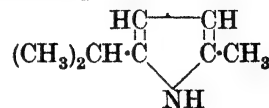
Cryst. from EtOH. M.p. 58.9°. B.p. 124–6°/14 mm.

Locquin, Heilmann, *Bull. soc. chim.*, 1929, **45**, 878.

Methylisopropylpyridine.

See Isopropylpicoline.

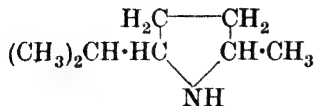
2-Methyl-5-isopropylpyrrole



MW, 123

Oil. B.p. 83°/13 mm. D_4^{20} 0.9269, $D_4^{20.8}$ 0.9108. $n_D^{16.8}$ 1.4998.

Tschugajew, Schlesinger, *J. Russ. Phys.-Chem. Soc.*, 1904, **36**, 1261.

2-Methyl-5-isopropylpyrrolidine

$\text{C}_8\text{H}_{17}\text{N}$

MW, 127

B.p. 150–1°. D_4^{20} 0.823. n_D^{20} 1.4398.

B, HCl : m.p. 218–20°.

$B_2, \text{H}_2\text{PtCl}_6$: m.p. 221–3°.

N -Benzenesulphonyl: m.p. 76–8°.

N -Nitroso: b.p. 114°/10 mm.

Wallach, *Ber.*, 1905, **38**, 2805.

3-Methyl-6-isopropylsalicylaldehyde.

See 2-Hydroxy-4-isopropyl-*m*-toluic Aldehyde.

3-Methyl-6-isopropylsalicylic Acid.

See 2-Hydroxy-4-isopropyl-*m*-toluic Acid.

Methyl isopropyl sulphide

$\text{C}_4\text{H}_{10}\text{S}$

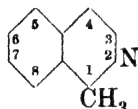
MW, 90

B.p. 93–5°.

Obermeyer, *Ber.*, 1887, **20**, 2923.

Methylisopropylthiophenol.

See Thiocarvacrol and Thiathymol.

1-Methylisoquinoline

$\text{C}_{10}\text{H}_9\text{N}$

MW, 143

F.p. 10.4–10.1°. B.p. 248°. $D_4^{20.5}$ 1.0763. $n_D^{20.5}$ 1.6095.

B, HCl : needles. M.p. about 170°.

$B, \text{H}_2\text{SO}_4$: prisms. M.p. 246–7°.

$B_2, \text{H}_2\text{Cr}_2\text{O}_7$: yellowish-red prisms from H_2O . Decomp. at 150°.

$B_2, \text{H}_2\text{PtCl}_6$: yellowish-red prisms + $2\text{H}_2\text{O}$ from H_2O . M.p. anhyd. 210°.

Picrate : cryst. from MeOH . M.p. 225–6°.

Methiodide : needles from EtOH . M.p. 207.5°. Spar. sol. cold H_2O .

Mills, Smith, *J. Chem. Soc.*, 1922, **121**, 2732.

Späth, Berger, Kuntara, *Ber.*, 1930, **63**, 136.

Pictet, Gams, *Ber.*, 1910, **43**, 2389.

3-Methylisoquinoline.

Cryst. from Et_2O . M.p. 68°. B.p. 246°/761 mm. $k = 4.4 \times 10^{-9}$ at 25°.

$B_2, \text{H}_2\text{PtCl}_6$: orange-yellow needles from H_2O . M.p. about 195° decomp.

Picrate : needles. M.p. 197–8°. Spar. sol. H_2O .

Methiodide : golden needles from EtOH . M.p. 219°.

See first reference above.

4-Methylisoquinoline.

B.p. 256°.

$B_2, \text{H}_2\text{PtCl}_6$: brownish-red cryst. M.p. 253.5°.

Picrate : needles. M.p. 202–3° (194–5°).

Späth, Berger, Kuntara, *Ber.*, 1930, **63**, 140.

Le Blanc, *Ber.*, 1888, **21**, 2300.

5-Methylisoquinoline.

Picrate : cryst. from MeOH . M.p. 235–6°.

See first reference above.

6-Methylisoquinoline.

Cryst. M.p. 83°. B.p. 263–4°.

Picrate : cryst. M.p. 212°.

Pomeranz, *Monatsh.*, 1897, **18**, 3.

7-Methylisoquinoline.

M.p. 66°.

$B_2, \text{H}_2\text{PtCl}_6$: cryst. M.p. 225°.

Dichromate : m.p. 126°.

Picrate : m.p. 197°.

Findeklee, *Ber.*, 1905, **38**, 3549.

8-Methylisoquinoline.

B.p. 258°.

Picrate : yellow needles from H_2O . M.p. 204–5°.

Pomeranz, *Monatsh.*, 1897, **18**, 2.

Methylisoserine.

See 1-Hydroxy-2-aminobutyric Acid and 1-Hydroxy-2-aminoisobutyric Acid.

Methyl isothiocyanate

$\text{C}_2\text{H}_3\text{NS}$

MW, 73

Cryst. M.p. 35.93°. B.p. 119°/758 mm. $D_4^{27.2}$ 1.06912. n_D 1.52576. Heat of comb. C_v 441.6 Cal.

Delépine, *Bull. soc. chim.*, 1908, **3**, 642.

S-Methylisothiurea (S-Methyl- ψ -thiourea)

$\text{C}_2\text{H}_6\text{N}_2\text{S}$

MW, 90

Free base not isolated.

B, HCl : cryst. M.p. 59–60°.

B, HI : prisms. M.p. 117°. Sol. H_2O , EtOH .

B, HNO_3 : cryst. from HNO_3 . M.p. 109–10°. Sol. MeOH , EtOH . Mod. sol. H_2O .

$B_2H_2SO_4$: cryst. M.p. 235° decomp. Sol. H_2O .

$B, HSCN$: m.p. 78–80°.

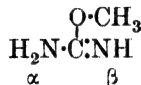
Salicylate: needles. M.p. 155°.

Picrate: m.p. 221°.

Shildneck, Windus, *Organic Syntheses*, 1932, XII, 52.

Taylor, *J. Chem. Soc.*, 1917, 111, 655.

O-Methylisourea (γ -Methyl- ψ -urea, methoxyformamidine)



$C_2H_6ON_2$

MW, 74

Cryst. M.p. 44–5°. B.p. 82°/9 mm. $k = 6.4 \times 10^{-5}$ at 25°. Volatile in EtOH and Et₂O vapours. Takes up H_2O and CO_2 from air.

B, HCl : prisms. M.p. 130°. Very sol. H_2O , EtOH.

B_2, H_2PtCl_6 : orange-yellow needles. M.p. 178° decomp.

β -Acetyl: cryst. from pet. ether. M.p. 58.5°.

β -Carbethoxyl: m.p. 5°.

β -1-Naphthalenesulphonyl: m.p. 152°.

Salicylate: m.p. 128°.

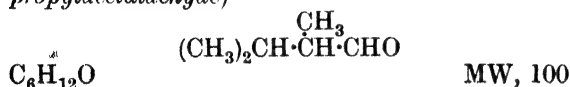
Picrate: m.p. 184° decomp.

Stieglitz, McKee, *Ber.*, 1900, 33, 1517.

Bruce, *J. Am. Chem. Soc.*, 1904, 26, 422.

Basterfield, Powell, *Chem. Abstracts*, 1930, 24, 1356.

1-Methylisovaleraldehyde (*Methylisopropylacetaldehyde*)



Semicarbazone: cryst. from C_6H_6 -pet. ether. M.p. 129–30°. $[\alpha]_D^{25} = -52.2^\circ$ in EtOH.

2:4-Dinitrophenylhydrazone: plates from ligroin. M.p. 124–5°.

Guiteras, Nakamiya, Inhoffen, *Ann.*, 1932, 494, 118.

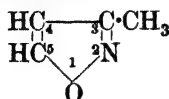
1-Methylisovaleric Acid.

1:2-Dimethylbutyric Acid, q.v.

Methylisovalerophenone.

See Isobutyl tolyl Ketone.

3-Methylisoxazole (γ -Methylisoxazole)



C_4H_5ON

MW, 83

B.p. 118°. D_4^{20} 1.022. n_D^{20} 1.435.

Auwers, *Ber.*, 1924, 57, 463.

Claisen, *Ber.*, 1909, 42, 65.

5-Methylisoxazole (α -Methylisoxazole).

B.p. 122°. D_4^{20} 1.023. n_D^{20} 1.439. Easily decomp. by alkalis.

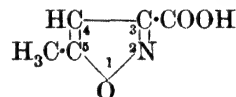
$B_2, PtCl_4$: yellow cryst. from EtOH.Aq. M.p. 210–12°.

Methiodide: cryst. M.p. 125–6°.

See previous references and also

Claisen, *Ber.*, 1911, 44, 1161.

5-Methylisoxazole-3-carboxylic Acid



$C_5H_5O_3N$

MW, 127

Prisms or plates from H_2O . M.p. 176° (172–3°). Sol. hot H_2O , EtOH. Spar. sol. Et₂O, $CHCl_3$.

Me ester: $C_6H_7O_3N$. MW, 141. Cryst. from C_6H_6 . M.p. 98–9°.

Hydrazide: cryst. from C_6H_6 . M.p. 131–2°.

Freri, *Gazz. chim. ital.*, 1932, 62, 461.

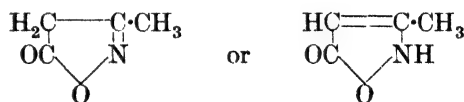
Wolff, Herold, *Ann.*, 1901, 317, 19.

3-Methylisoxazole-5-carboxylic Acid.

Cryst. M.p. 211°.

Claisen, *Ber.*, 1909, 42, 60.

3-Methylisoxazolone (*2-Oximinobutyric acid anhydride*)



$C_4H_5O_2N$

MW, 99

Needles from H_2O . M.p. 169–70° decomp. Sol. hot H_2O , MeOH, EtOH, hot $CHCl_3$. Spar. sol. C_6H_6 , CS_2 , pet. ether.

N-Me: $C_5H_7O_2N$. MW, 113. Cryst. M.p. 74°.

N-Et: $C_6H_9O_2N$. MW, 127. Prisms. M.p. 90–1°.

Isonitroso deriv.: leaflets from H_2O . M.p. 159°.

Phenylhydrazone: yellow cryst. from C_6H_6 . M.p. 192° decomp.

p-Hydroxyphenylhydrazone: m.p. 219–20° decomp.

o-Tolylhydrazone: m.p. 154–5°.

p-Tolylhydrazone: m.p. 202°.

1-Naphthylhydrazone : m.p. 168–70°.

2-Naphthylhydrazone : m.p. 200°.

Uhlenhuth, *Ann.*, 1897, **296**, 46.

Bouveault, Wahl, *Ber.*, 1905, **38**, 2066.

Schiff, Viciani, *Ber.*, 1897, **30**, 1162.

1-Methylitaconic Acid.

See Ethylidene-succinic Acid.

3-Methylitaconic Acid (1-Butylene-2 : 3-dicarboxylic acid, 1-methyl-2-methylene-succinic acid)



$\text{C}_6\text{H}_8\text{O}_4$ MW, 144

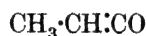
Prisms from H_2O . M.p. 151–2° (150–1°). Very sol. H_2O , EtOH. Spar. sol. CHCl_3 . Insol. C_6H_6 , CS_2 , ligroin. Acetyl chloride \rightarrow anhydride.

Anhydride : $\text{C}_6\text{H}_6\text{O}_3$. MW, 126. Plates from CS_2 . M.p. 62–3°.

Molinari, *Ber.*, 1900, **33**, 1417.

Fittig, Kettner, *Ann.*, 1899, **304**, 166.

Methylketene



$\text{C}_3\text{H}_4\text{O}$ MW, 56

Known only in Et_2O sol. Aniline \rightarrow propionanilide.

Di-Et acetal : 1 : 1 - diethoxypropylene. $\text{C}_7\text{H}_{14}\text{O}_2$. MW, 130. B.p. 78–81°. D_4^{15} 0.8002. n_D^{18} 1.3673.

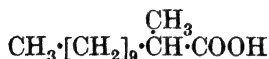
Scheibler, Marhenkel, Nikolić, *Ann.*, 1927, **458**, 21.

Staudinger, Klever, *Ber.*, 1908, **41**, 906.

Methylketol.

See Hydroxyacetone.

1-Methyl-lauric Acid (1-Methyldodecylic acid)



$\text{C}_{13}\text{H}_{27}\text{O}_2$ MW, 215

d.

B.p. 153°/1 mm. $[\alpha]_D^{25} + 8.47^\circ$. After neutralisation shows no rotation.

l.

$[\alpha]_D^{25} - 6.38^\circ$ in Et_2O .

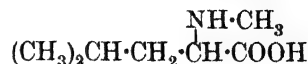
Chloride : $\text{C}_{13}\text{H}_{26}\text{OCl}$. MW, 233.5. B.p. 118–25°/0.5 mm. $[\alpha]_D^{25} - 3.5^\circ$ in Et_2O .

Amide : $\text{C}_{13}\text{H}_{28}\text{ON}$. MW, 214. Cryst. from 50% EtOH. M.p. 77° $[\alpha]_D^{25} - 3.01^\circ$ in 95% EtOH.

Nitrile : $\text{C}_{13}\text{H}_{26}\text{N}$. MW, 196. B.p. 108–10°/0.5 mm. $[\alpha]_D^{25} - 10.87^\circ$ in Et_2O .

Levene, Mikeska, *J. Biol. Chem.*, 1929, **84**, 590.

N-Methyl-leucine (1-Methylaminoisobutyl-acetic acid, 1-methylaminoisocaproic acid)



$\text{C}_7\text{H}_{15}\text{O}_2\text{N}$ MW, 145

l.

Cryst. from Me_2CO . Aq. Sublimes without melting. $[\alpha]_D^{21} - 20.76^\circ$ in H_2O . Sol. 22.5 parts H_2O at 25°. Spar. sol. EtOH.

dl.

Needles from EtOH. Aq. Sublimes without melting.

Friedmann, *Chem. Zentr.*, 1908, I, 971.

Fischer, v. Mechel, *Ber.*, 1916, **49**, 1358.

1-Methyl-levulinic Acid.

See 2-Acetoisobutyric Acid.

2-Methyl-levulinic Acid.

See 2-Acetobutyric Acid.

4-Methyl-levulinic Acid.

See 3-Keto-n-caproic Acid.

Methylmaleic Acid.

See Citraconic Acid.

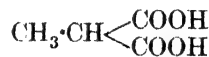
1-Methylmalic Acid.

See Citramalic Acid.

2-Methylmalic Acid.

See 2-Hydroxy-1-methylsuccinic Acid.

Methylmalonic Acid (Ethane-1 : 1-dicarboxylic acid, isosuccinic acid)



$\text{C}_4\text{H}_6\text{O}_4$ MW, 118

Needles from AcOEt-pet. ether or prisms from Et_2O - C_6H_6 . M.p. 135° (120°). Sol. EtOH, Et_2O , AcOEt. Spar. sol. H_2O , C_6H_6 . Heat of comb. C_v 362.5 Cal. $k = 8.7 \times 10^{-4}$ at 25°. Heat \rightarrow propionic acid.

Mono-Me ester : $\text{C}_5\text{H}_8\text{O}_4$. MW, 132. B.p. 131°/16 mm. Anilide : $\text{C}_{11}\text{H}_{13}\text{O}_3\text{N}$. MW, 207. Cryst. from Et_2O . M.p. 83–6°.

Di-Me ester : $\text{C}_6\text{H}_{10}\text{O}_4$. MW, 146. B.p. 178°. D_4^{20} 1.095. n_D^{20} 1.414.

Mono-Et ester : $\text{C}_6\text{H}_{10}\text{O}_4$. MW, 146. B.p. 144°/18 mm. D_4^{21} 1.1129. $k = 3.87 \times 10^{-4}$ at 25°. Chloride : $\text{C}_6\text{H}_9\text{O}_3\text{Cl}$. MW, 164.5. B.p. 100°/45 mm. Amide : $\text{C}_6\text{H}_{11}\text{O}_3\text{N}$. MW, 145. Needles from CS_2 . M.p. 72°. Sol. H_2O , EtOH, C_6H_6 , CS_2 . Anilide : $\text{C}_{12}\text{H}_{15}\text{O}_3\text{N}$. MW, 221. Cryst. M.p. 173–4°. p-Toluidide : $\text{C}_{13}\text{H}_{17}\text{O}_3\text{N}$. MW, 235. Plates. M.p. 85–7°.

Di-Et ester : $\text{C}_6\text{H}_{14}\text{O}_4$. MW, 174. B.p. 201.2–201.4°. D_4^{20} 1.018. $n_D^{18.7}$ 1.41369.

Dichloride : $\text{C}_4\text{H}_4\text{O}_2\text{Cl}_2$. MW, 155. B.p. 75°/50 mm.

Diamide: $C_4H_8O_2N_2$. MW, 116. Cryst. from H_2O . M.p. 206° . Insol. Et_2O .

Mononitrile: see 1-Cyanopropionic Acid.

Dinitrile: 1:1-dicyanoethane. $C_4H_4N_2$. MW, 80. Needles. M.p. 26° . B.p. $197-8^\circ$. Sol. $EtOH$, Et_2O , $CHCl_3$, C_6H_6 . Insol. H_2O , CS_2 .

Dihydrazide: cryst. from $EtOH.Aq$. M.p. 179° .

Monoanilide: $C_{10}H_{11}O_3N$. MW, 193. Leaflets from H_2O . M.p. 166° (180°).

Dianilide: $C_{16}H_{16}O_2N_2$. MW, 268. Leaflets from $EtOH$. M.p. 182° (214°).

Mono-p-toluidide: $C_{11}H_{13}O_3N$. MW, 207. Needles. M.p. 145° decomp.

Di-p-toluidide: $C_{18}H_{20}O_2N_2$. MW, 296. Needles. M.p. $227-8^\circ$ (245°).

Meyer, Bock, *Ann.*, 1906, **347**, 94.

Steele, *J. Am. Chem. Soc.*, 1931, **53**, 286.

Franchimont, Klobbie, *Rec. trav. chim.*, 1889, **8**, 285.

Marguery, *Bull. soc. chim.*, 1905, **33**, 542.

Michael, *J. prakt. Chem.*, 1906, **72**, 551.

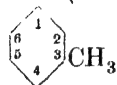
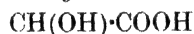
Auwers, *Ber.*, 1913, **46**, 509.

Comanducci, Lobello, *Gazz. chim. ital.*, 1905, **35**, ii, 311.

α -Methylmandelic Acid.

Atrolactic Acid, *q.v.*

m-Methylmandelic Acid (*m-Tolylglycollic acid*, α -hydroxy-m-tolylacetic acid)



$C_9H_{10}O_3$ MW, 166

Leaflets from C_6H_6 . M.p. 84° . Sol. H_2O , Et_2O , $CHCl_3$. Spar. sol. C_6H_6 . Insol. ligroin.

Bornemann, *Ber.*, 1884, **17**, 1469.

p-Methylmandelic Acid (*p-Tolylglycollic acid*, α -hydroxy-p-tolylacetic acid).

Plates from H_2O . M.p. $145-6^\circ$. Sol. $EtOH$, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. H_2O . Insol. ligroin.

Me ester: $C_{10}H_{12}O_3$. MW, 180. Cryst. from pet. ether. M.p. $48-50^\circ$. Very sol. most org. solvents.

Et ester: $C_{11}H_{14}O_3$. MW, 194. Needles from Et_2O . M.p. 77° . B.p. $155-8^\circ$.

Claus, Kroseberg, *Ber.*, 1887, **20**, 2050.

Auwers, *Ber.*, 1916, **49**, 2405.

Tiffeneau, Levy, *Bull. soc. chim.*, 1931, **49**, 1752.

Methylmannoside.

See under Mannose.

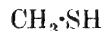
Methylmenthone.

See Homomenthone.

Methyl 3-p-menthyl Ether.

See under Menthol.

Methyl Mercaptan (*Methane-thiol*, *methyl thioalcohol*, *mercaptomethane*)



CH_4S

MW, 48

Gas with nauseating odour. M.p. -123° . B.p. $5.8-6.2^\circ$. D_4^{20} 0.8948, D_4^{25} 0.8599. Heat of comb. C_p 298.8 Cal. Forms cryst. hydrate.

Arndt, Milde, Eckert, *Ber.*, 1921, **54**, 2238.

Ellis, Reid, *J. Am. Chem. Soc.*, 1932, **54**, 1677.

Klason, *Ber.*, 1887, **20**, 3409.

3-Methylmercapto-1-aminobutyric Acid.

See Methionine.

4-Methylmercaptobutylamine.

See Methyl 4-aminobutyl sulphide.

2-Methylmercaptopropylamine.

See Methyl 1-aminoisopropyl sulphide.

3-Methylmercaptopropylamine.

See Methyl 3-aminopropyl sulphide.

Methylmesaconic Acid.

See Ethylfumaric Acid.

Methyl methacrylate.

See Methyl 1-methylacrylate.

Methyl p-methoxybenzyl Ketone.

See Anisylacetone.

Methyl p-methoxyphenyl Diketone.

See Acetylanisoyl.

Methyl methoxyphenyl Ketone.

See under Hydroxyacetophenone.

Methyl methoxyphenyl sulphide.

See under Thiocatechol and Thiohydroquinone.

Methyl p-methoxystyryl Ketone.

See Anisylideneacetone.

Methyl 1-methylacrylate (*Methyl methacrylate*)



$C_5H_8O_2$

MW, 100

B.p. $100-101^\circ$. Polymerises on exposure to light or heat in presence of O \rightarrow resinous products.

I.C.I., F.P., 745,085, (*Chem. Abstracts*, 1933, **29**, 4363); E.P., 410,208, (*Chem. Zentr.*, 1934, II, 3182).

Methyl 3:4-methylenedioxyphenylethyl Ketone.

See Piperonylacetone.

2-Methyl-6-methyleneoctadiene-2:7.

See Myrcene.

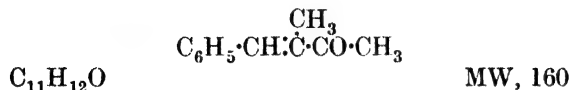
2-Methyl-6-methylene-1-octenol-8.

See Isogeraniol.

1-Methyl-2-methylene-succinic Acid.

See 3-Methylitaconic Acid.

Methyl β -methylstyryl Ketone (*Methyl 1-benzylidene-ethyl ketone*, 3-keto-2-methyl-1-phenyl-butylene, 2-methyl-1-phenyl-1-butenone-3, 1-methyl-1-benzylidene-acetone, β -methyl- β -acetostyrene)



Colourless needles. M.p. 38-9°. B.p. 130°/12 mm. D_4^{20} 1.0274, D_4^{25} 1.0072. n_D^{20} 1.5743. n_D^{40} 1.572.

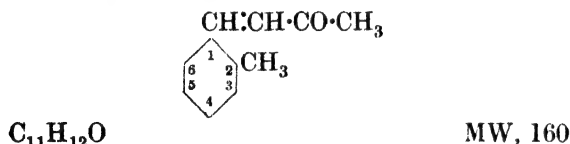
Oxime: prisms. M.p. 104°.

Phenylhydrazone: m.p. 105°.

Semicarbazone: exists in two phototropic forms. (i) M.p. 173°. (ii) M.p. 204°.

Auwers, *Ber.*, 1912, **45**, 2774.Harries, Müller, *Ber.*, 1902, **35**, 968.Gheorghiu, Arwentiew, *Chem. Abstracts*, 1932, **26**, 4804.

Methyl o-methylstyryl Ketone (*o-Methylbenzylideneacetone*, 1-o-tolyl-1-butenone-3, o-methyl- β -acetostyrene)



M.p. 0°. B.p. 136-8°/10 mm.

Meerwein, *Ann.*, 1908, **358**, 89.

Methyl p-methylstyryl Ketone (*p-Methylbenzylideneacetone*, 1-p-tolyl-1-butenone-3, p-methyl- β -acetostyrene).

Plates from ligroin. M.p. 34-5°. B.p. 277-8°, 155-6°/15 mm. (142-5°/15 mm.). Sol. EtOH, Et₂O.

Oxime: leaflets from EtOH. M.p. 126°.

Azine: yellow needles from PhNO₂. M.p. 190°.

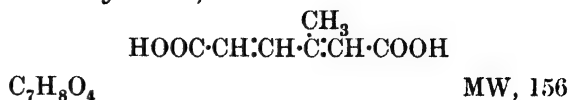
Phenylhydrazone: needles from EtOH. M.p. 154° (138°).

Semicarbazone: needles from EtOH. M.p. 202°. Turns yellow on exposure to light.

Hanzlik, Bianchi, *Ber.*, 1899, **32**, 2282.Gattermann, *Ann.*, 1906, **347**, 361.**Methyl methylthienyl Ketone.**

See Acetomethylthienone.

2-Methylmuconic Acid (*Isoprene-1:4-dicarboxylic acid*, 2-methyl-1:3-butadiene-1:4-dicarboxylic acid)



Trans:

Cryst. powder from H₂O. M.p. 235° (231°) decomp.

Mono-Me ester: C₈H₁₀O₄. MW, 170. M.p. 126°.

Di-Me ester: C₉H₁₂O₄. MW, 184. B.p. 145°/9 mm.

Di-Et ester: C₁₁H₁₆O₄. MW, 212. B.p. 175°/10 mm.

Cis:

Cryst. powder from EtOH. M.p. 170-1°. Spar. sol. H₂O, EtOH, Et₂O, C₆H₆.

Mono-Me ester: needles from C₆H₆. M.p. 125°. Sol. EtOH, Et₂O. Spar. sol. H₂O, C₆H₆. Amide: C₈H₁₁O₃N. MW, 169. Prisms from MeOH. M.p. 161-2°.

Di-Me ester: needles from pet. ether. M.p. 38°. B.p. 142-3°/16 mm. D_4^{20} 1.115. Sol. most org. solvents. Spar. sol. H₂O.

Di-Et ester: b.p. 163-4°/19 mm. D_4^{20} 1.056. n_D^{17} 1.495.

Diamide: C₇H₁₀O₂N₂. MW, 154. Needles from MeOH. M.p. 213-14°.

Rinkes, *Rec. trav. chim.*, 1929, **48**, 603, 1093.

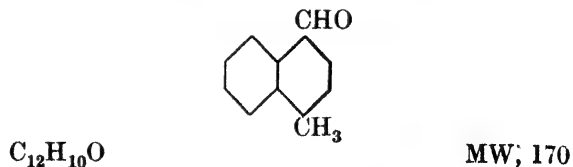
Stephen, Weizmann, *J. Chem. Soc.*, 1913, **103**, 276.

Pauly, Will, *Ann.*, 1918, **416**, 7, 19.

Auwers, *J. prakt. Chem.*, 1923, **105**, 383.

Methylnaphthafuran.

See Methylbenzcoumarone.

4-Methyl-1-naphthaldehyde

Cryst. from pet. ether. M.p. 33-5-34°. B.p. 174-6°/13 mm.

Semicarbazone: plates from EtOH. M.p. 237° (228°).

Azine: light yellow cryst. from EtOH. M.p. 136-7°.

Ziegler, Tiemann, *Ber.*, 1922, **55**, 3410.

1-Methylnaphthalene (α -Methylnaphthalene) $C_{11}H_{10}$ MW, 142

Oil. F.p. -22° . B.p. 241° , $110^\circ/12$ mm.
Sol. EtOH, Et₂O. D_{40}^{25} 1.0287, D_{20}^{25} 1.0005.
Volatile in steam.

Picrate: orange-red cryst. from EtOH. M.p. $141-2^\circ$.

Darzens, Lévy, *Compt. rend.*, 1934, **199**, 1131.

Darzens, *Compt. rend.*, 1926, **183**, 748.

I.G., D.R.P., 509,149, (*Chem. Abstracts*, 1931, **25**, 711).

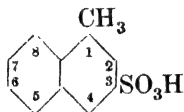
2-Methylnaphthalene (β -Methylnaphthalene).

Found in low-temp. tar. Cryst. M.p. $37-8^\circ$ (32°). B.p. $240-2^\circ/760$ mm., $110-12^\circ/16$ mm.

Picrate: yellow cryst. from EtOH. M.p. $115-16^\circ$.

$C_{11}H_{10}$, $C_6H_3(NO_2)_3$ -1:3:5: yellow needles. M.p. 123° .

Barbot, *Bull. soc. chim.*, 1930, **47**, 1314.

1-Methylnaphthalene-3-sulphonic Acid $C_{11}H_{10}O_3S$ MW, 222

Chloride: $C_{11}H_9O_3S$ Cl. MW, 240.5. Cryst. from Et₂O. M.p. $124-5^\circ$.

Amide: $C_{11}H_{11}O_2NS$. MW, 221. Cryst. from EtOH. M.p. $143-4^\circ$.

Vesely, Štursa, *Chem. Zentr.*, 1931, **II**, 996.

1-Methylnaphthalene-4-sulphonic Acid.

Chloride: cryst. from Et₂O. M.p. 81° ($78-80^\circ$). Sol. 2 parts boiling Et₂O.

Amide: needles from EtOH. M.p. 177° (174°).

Steiger, *Helv. Chim. Acta*, 1930, **13**, 177.

Vesely, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, **24**, 611.

1-Methylnaphthalene-5-sulphonic Acid.

Plates. M.p. 115° .

Amide: cryst. from EtOH. M.p. $176-8^\circ$.

Vesely, Štursa, *Chem. Zentr.*, 1931, **II**, 996.

1-Methylnaphthalene-6-sulphonic Acid.

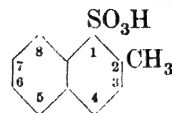
Chloride: needles from ligroin. M.p. $120-2^\circ$.

Amide: plates from boiling H₂O or EtOH. Aq. M.p. $188-9^\circ$.

Anilide: plates from boiling H₂O. M.p. $248-50^\circ$.

Dziewoński, Waszkowski, *Chem. Zentr.*, 1930, **I**, 1934.

Dziewoński, Otto, *Brit. Chem. Abstracts*, 1935, **A**, 1116.

2-Methylnaphthalene-1-sulphonic Acid $C_{11}H_{10}O_3S$ MW, 222

Chloride: $C_{11}H_9O_3S$ Cl. MW, 240.5. Needles from Et₂O. M.p. $83-5^\circ$.

Amide: $C_{11}H_{11}O_2NS$. MW, 221. Cryst. from EtOH. M.p. 124° .

Vesely, Páček, *Chem. Zentr.*, 1930, **II**, 1547.

2-Methylnaphthalene-6-sulphonic Acid.

Ester: $C_{13}H_{14}O_3S$. MW, 250. Plates from H₂O. M.p. $79-80^\circ$.

Chloride: cryst. from ligroin. M.p. $97-8^\circ$. Sol. Et₂O, C₆H₆. Spar. sol. ligroin.

Amide: plates from H₂O. M.p. $205-6^\circ$. Sol. EtOH, Et₂O, alkalis. Spar. sol. hot H₂O.

Dziewoński, Schoenówna, Waldmann, *Ber.*, 1925, **58**, 1212.

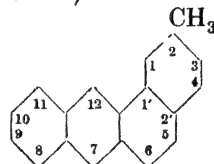
2-Methylnaphthalene-8-sulphonic Acid.

Chloride: needles from Et₂O. M.p. 96° .

Amide: plates. M.p. $195-6^\circ$.

Anilide: needles. M.p. $162-4^\circ$.

Vesely, Páček, *Chem. Zentr.*, 1930, **II**, 1548.

2-Methylnaphthanthracene (2-Methyl-1':2'-benzanthracene) $C_{19}H_{14}$ MW, 242

Cryst. from EtOH. M.p. $149-50^\circ$.

Picrate: m.p. 180° .

Cook, *J. Chem. Soc.*, 1932, 471.

3-Methylnaphthanthracene (3-Methyl-1':2'-benzanthracene).

Cryst. from EtOH. M.p. 160° .

Picrate: m.p. $144-5^\circ$.

See above reference.

5-Methylnaphthanthracene (5-Methyl-1' : 2'-benzanthracene).

Plates from C_6H_6 -pet. ether. M.p. 153-4°. Sol. EtOH, AcOH, C_6H_6 , Py, pet. ether.

Cook, *J. Chem. Soc.*, 1930, 1093.

6-Methylnaphthanthracene (6-Methyl-1' : 2'-benzanthracene).

Needles from EtOH. M.p. 107°.

Picrate : needles from EtOH. M.p. 119°.

Fieser, Peters, *J. Am. Chem. Soc.*, 1932, **54**, 3750.

9-Methylnaphthanthracene (9-Methyl-1' : 2'-benzanthracene).

Cryst. from EtOH. M.p. 150.5-151.5°.

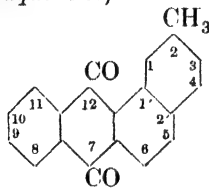
Picrate : m.p. 152-3°.

Cook, *J. Chem. Soc.*, 1932, 470.

10-Methylnaphthanthracene (10-Methyl-1' : 2'-benzanthracene).

Cryst. from C_6H_6 . M.p. 182°.

See previous reference.

2-Methylnaphthanthraquinone (2-Methyl-1' : 2'-benzanthraquinone)

$C_{19}H_{12}O_2$ MW, 272

Orange needles from methyl ethyl ketone. M.p. 189-90°.

Cook, *J. Chem. Soc.*, 1932, 471.

Fieser, Peters, *J. Am. Chem. Soc.*, 1932, **54**, 3749.

3-Methylnaphthanthraquinone (3-Methyl-1' : 2'-benzanthraquinone).

Orange needles from methyl ethyl ketone. M.p. 168°.

See previous references.

4-Methylnaphthanthraquinone (4-Methyl-1' : 2'-benzanthraquinone).

Light brown needles. M.p. 215-16°. Dirty green col. in H_2SO_4 . Ox. \rightarrow anthraquinone-1 : 2-dicarboxylic acid.

Scholl, Seer, Zinke, *Monatsh.*, 1921, **41**, 583.

6-Methylnaphthanthraquinone (6-Methyl-1' : 2'-benzanthraquinone).

Yellow needles from AcOH. M.p. 167°.

Fieser, Peters, *J. Am. Chem. Soc.*, 1932, **54**, 3750.

8-Methylnaphthanthraquinone (8-Methyl-1' : 2'-benzanthraquinone).

Orange yellow needles from AcOH. M.p. 174°.

Cook, *J. Chem. Soc.*, 1933, 1596.

9-Methylnaphthanthraquinone (9-Methyl-1' : 2'-benzanthraquinone).

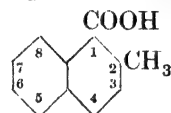
Orange needles. M.p. 174°.

Cook, *J. Chem. Soc.*, 1932, 470.

10-Methylnaphthanthraquinone (10-Methyl-1' : 2'-benzanthraquinone).

Orange needles from AcOH. M.p. 167°.

Cook, *J. Chem. Soc.*, 1932, 471.

2-Methyl-1-naphthoic Acid

$C_{12}H_{10}O_2$ MW, 186

Prisms from AcOH.Aq. M.p. 126-7°.

Me ester : $C_{13}H_{12}O_2$. MW, 200. B.p. 168-70°/15 mm.

Et ester : $C_{14}H_{14}O_2$. MW, 214. B.p. 180-3°/15 mm.

l-Menthyl ester : cryst. from EtOH. M.p. 139.5°.

Chloride : $C_{12}H_9OCl$. MW, 204.5. B.p. 170-2°/20 mm.

Amide : $C_{12}H_{11}ON$. MW, 185. Cryst. from C_6H_6 . M.p. 143°.

Anilide : cryst. from MeOH. M.p. 167-8°.

Mayer, Sieglitz, *Ber.*, 1922, **55**, 1851.

Rule, Spence, Bretscher, *J. Chem. Soc.*, 1929, 2522.

4-Methyl-1-naphthoic Acid.

Cryst. from AcOH. M.p. 175° (165°).

Me ester : b.p. 192-4°/12 mm.

Et ester : b.p. 203°/12 mm.

Chloride : b.p. 150-60°/12 mm.

Amide : needles from C_6H_6 . M.p. 193°.

Anilide : cryst. from C_6H_6 . M.p. 179°.

Hydrazide : needles from EtOH. M.p. 154°.

I.G., E.P., 333,667, (*Chem. Abstracts*, 1931, **25**, 603).

I.G., D.R.P., 558,471, (*Chem. Abstracts*, 1933, **27**, 310).

See also first reference above.

6-Methyl-1-naphthoic Acid.

Needles from H_2O . M.p. 150-2°. Very sol. EtOH, Et₂O, $CHCl_3$, Me_2CO . Sol. hot C_6H_6 , hot toluene. Spar. sol. ligroin.

Me ester: light yellow oil. B.p. 183–7°/30 mm.

Et ester: yellow oil. B.p. 203–5°/30 mm.

Weissgerber, Kruber, *Ber.*, 1919, **52**, 352, 628.

7-Methyl-1-naphthoic Acid.

Needles from ligroin. M.p. 147°.

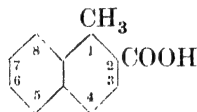
Dziewoński, Brand, *Chem. Zentr.*, 1933, II, 2390.

8-Methyl-1-naphthoic Acid.

Prisms or needles from pet. ether. M.p. about 130–1°. Sol. EtOH, C₆H₆. Spar. sol. pet. ether.

Errara, Ajon, *Gazz. chim. ital.*, 1914, **44**, ii, 97.

1-Methyl-2-naphthoic Acid



C₁₂H₁₀O₂

MW, 186

Needles from C₆H₆. M.p. 178°.

Et ester: C₁₄H₁₄O₂. MW, 214. Cryst. M.p. 27–8°. B.p. 190°/20 mm., 184°/13 mm.. D₄²⁰ 1.113. n_D²⁰ 1.595.

Auwers, Möller, *J. prakt. Chem.*, 1925, **109**, 148.

Mayer, Schnecko, *Ber.*, 1923, **56**, 1410.

4-Methyl-2-naphthoic Acid.

Cryst. M.p. 198–9°.

Me ester: C₁₃H₁₂O₂. MW, 200. Cryst. M.p. 39°. B.p. 188°/15 mm.

Darzens, *Compt. rend.*, 1926, **183**, 748.

6-Methyl-2-naphthoic Acid.

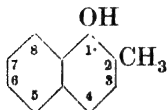
Cryst. from MeOH or AcOH.Aq. M.p. 228–30° (225–7°).

Me ester: needles from MeOH. M.p. 116–17°.

Haworth, Letsky, Mavin, *J. Chem. Soc.*, 1932, 1788.

Dziewoński, Brand, *Chem. Zentr.*, 1933, II, 2390.

2-Methyl-1-naphthol (1-Hydroxy-2-methylnaphthalene)



C₁₁H₁₀O

MW, 158

Needles from pet. ether. M.p. 64–5°. Sol. usual org. solvents. Turns red in air. Conc. H₂SO₄ → green sol. → pink on dilution.

Lesser, *Ann.*, 1913, **402**, 42.

Veselý, Páček, *Chem. Zentr.*, 1930, II, 1548.

4-Methyl-1-naphthol (4-Hydroxy-1-methylnaphthalene).

Needles from C₆H₆-pet. ether. M.p. 84–5°. Sol. H₂O, most org. solvents.

Benzoyl: prisms from pet. ether. M.p. 81–2°.

Steiger, *Helv. Chim. Acta*, 1930, **13**, 180.

5-Methyl-1-naphthol (5-Hydroxy-1-methylnaphthalene).

Needles from pet. ether. M.p. 97–8°.

Benzoyl: plates. M.p. 77–8°.

Veselý, Štursa, *Chem. Zentr.*, 1931, II, 996.

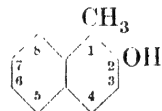
7-Methyl-1-naphthol (8-Hydroxy-2-methylnaphthalene).

Needles from pet. ether. M.p. 109–11°. B.p. 158–9°/12 mm.

Veselý, Páček, *Chem. Zentr.*, 1930, II, 1548.

Krollpfeiffer, Schäfer, *Ber.*, 1923, **56**, 625.

1-Methyl-2-naphthol (2-Hydroxy-1-methylnaphthalene)



C₁₁H₁₀O

MW, 158

Needles from H₂O or C₆H₆-ligroin. M.p. 112° (110°). Sol. EtOH, Et₂O, C₆H₆, CHCl₃, AcOH. Less sol. hot H₂O, ligroin. Sublimes. Distills undecomp. Conc. H₂SO₄ → reddish-yellow col. Sol. alkalis with blue fluor.

Me ether: C₁₂H₁₂O. MW, 172. Plates from MeOH. M.p. 41–2° (39°). B.p. 162–3°/20 mm.

Et ether: C₁₃H₁₄O. MW, 186. Plates from EtOH. M.p. 52° (50°).

Acetyl: prisms from pet. ether. M.p. 66°.

Benzoyl: needles from EtOH. M.p. 117°.

Picrate: red needles from EtOH or C₆H₆. M.p. 163–4° (162–3°).

Betti, Mundici, *Gazz. chim. ital.*, 1905, **36**, ii, 657.

Fries, Hubner, *Ber.*, 1906, **39**, 442.

M.L.B., D.R.P., 161,450, (*Chem. Zentr.*, 1905, II, 183).

Dziewoński, Dragan, Marchówna, *Chem. Zentr.*, 1935, I, 2529.

3-Methyl-2-naphthol (3-Hydroxy-2-methylnaphthalene).

Cryst. from xylene. M.p. 155–6°. B.p. 176°/20 mm.

Veselý, Štursa, *Chem. Zentr.*, 1934, I, 3589.

4-Methyl-2-naphthol (3-Hydroxy-1-methylnaphthalene).

Needles. M.p. 81–2°.

Benzoyl: m.p. 117–18°.

Vesely, Štursa, *Chem. Zentr.*, 1931, II, 996.**5-Methyl-2-naphthol** (6-Hydroxy-1-methylnaphthalene).Cryst. from ligroin or boiling H₂O. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O.

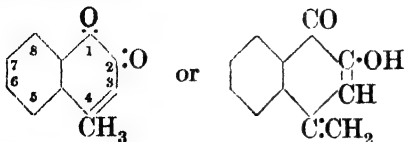
Benzoyl: needles from EtOH.Aq. M.p. 107–8°

Dziewoński, Waszkowski, *Chem. Zentr.*, 1930, I, 1934.Dziewoński, Otto, *Brit. Chem. Abstracts*, 1935, A, 1116.**6-Methyl-2-naphthol** (6-Hydroxy-2-methylnaphthalene).Cryst. from ligroin. M.p. 128–9°. Very sol. EtOH, Et₂O. Sol. ligroin. Spar. sol. boiling H₂O. Heat with FeCl₃ \rightarrow olive green col. KOH + CHCl₃ \rightarrow blue col. \rightarrow green.Me ether: C₁₂H₁₂O. MW, 172. Plates from EtOH.Aq. M.p. 78–9°. Very sol. EtOH, most org. solvents.

Benzoyl: needles from EtOH. M.p. 128–9°. Sol. boiling EtOH, and most org. solvents.

Dziewoński, Schoenówna, Waldmann, *Ber.*, 1925, 58, 1214.**8-Methyl-2-naphthol** (7-Hydroxy-1-methylnaphthalene).Needles from H₂O. M.p. 70–1° (69–70°). B.p. 176°/10 mm. (178–80°/15 mm.).

Me ether: plates from pet. ether. M.p. 47–8°. B.p. 159–61°/15 mm., 152–3°/10 mm.

Benzoyl: plates from Et₂O, prisms from pet. ether. M.p. 88–90°.Vesely, Štursa, *Chem. Zentr.*, 1933, II, 378.Haworth, Sheldrick, *J. Chem. Soc.*, 1934, 1951.**4-Methyl-1 : 2-naphthoquinone** (4-Methyl- β -naphthoquinone)C₁₁H₈O₂

MW, 172

Needles from AcOH. M.p. about 248–50° decomp. Blue sols in alkalis.

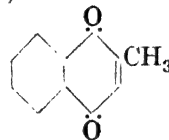
Me ether: C₁₂H₁₀O₂. MW, 186. Yellow

needles from EtOH. M.p. 184–5°. Phenylhydrazone: m.p. about 254–7° decomp.

Acetyl: yellow needles from AcOEt. M.p. 212–13° decomp. Phenylhydrazone: m.p. about 278–81° decomp.

Dean, Nierenstein, *J. Chem. Soc.*, 1916, 109, 593.**6-Methyl-1 : 2-naphthoquinone** (6-Methyl- β -naphthoquinone).

Orange-yellow needles from ligroin. M.p. 131–2°.

Dziewoński, Schoenówna, Waldmann, *Ber.*, 1925, 58, 1215.**2-Methyl-1 : 4-naphthoquinone** (2-Methyl- α -naphthoquinone)C₁₁H₈O₂

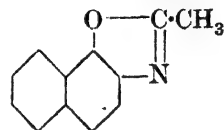
MW, 172

Yellow needles from EtOH or pet. ether. M.p. 106° (104°). Sol. C₆H₆, Et₂O. Mod. sol. EtOH, AcOH. Spar. sol. H₂O, pet. ether. Conc. H₂SO₄ \rightarrow red sol. Decomp. by NaOH. Volatile in steam.

Dioxime: m.p. 166–8°.

Fries, Lohmann, *Ber.*, 1921, 54, 2918.Madina veitia, de Buruaga, *Chem. Abstracts*, 1930, 24, 359.**5-Methyl-1 : 4-naphthoquinone** (5-Methyl- α -naphthoquinone).

Needles from pet. ether. M.p. 121–2° (102–3°). Sol. most org. solvents.

Herzenberg, Ruhemann, *Ber.*, 1927, 60, 897.Vesely, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, 24, 612.**2-Methyl- α -naphthoxazole**C₁₂H₉ON

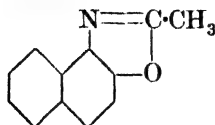
MW, 183

M.p. 36–7°. B.p. 178–201°/18–20 mm.

Methiodide: cryst. from EtOH. M.p. 202° decomp.

Ethiodide: cryst. from EtOH. M.p. 215° decomp.

Fischer, Hamer, *J. Chem. Soc.*, 1934, 963.

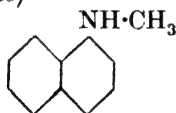
2-Methyl- β -naphthoxazole $C_{12}H_9ON$

MW, 183

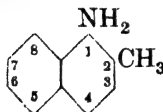
M.p. 27°. B.p. 158–60°/14 mm.

 $B.HCl$: m.p. 177°.*Methiodide*: cryst. from EtOH. M.p. 212–13° decomp.*Ethiodide*: cryst. from EtOH. M.p. 202–3° decomp.

See previous reference.

N-Methyl-1-naphthylamine (α -Methylaminonaphthalene) $C_{11}H_{11}N$

MW, 157

Oil. B.p. 293–6°, 175–6°/16 mm. Sol. EtOH, Et_2O , CS_2 . Darkens in air. Sol. in Et_2O shows blue fluor. Alc. $FeCl_3 \rightarrow$ dark violet col. B_2, H_2PtCl_6 : yellowish-green cryst. + $2H_2O$. Decomp. at 105–10°.*Acetyl*: cryst. M.p. 93–4°.*p-Toluenesulphonyl*: prisms from EtOH. M.p. 163–4°.v. Braun, Heider, Müller, *Ber.*, 1918, 51, 281.Rodionow, Vvedenskij, *Bull. soc. chim.*, 1929, 45, 121.**2-Methyl-1-naphthylamine** (1-Amino-2-methylnaphthalene) $C_{11}H_{11}N$

MW, 157

Needles from pet. ether. M.p. 32°. Sol. most org. solvents. Spar. sol. H_2O . $B.HCl$: needles. Decomp. above 230°. Sol. EtOH. Spar. sol. H_2O .*Acetyl*: needles from C_6H_6 . M.p. 188°.*Benzoyl*: plates from toluene. M.p. 180°.Lesser, *Ann.*, 1913, 402, 38.**3-Methyl-1-naphthylamine** (4-Amino-2-methylnaphthalene).

Cryst. from pet. ether. M.p. 51–2°.

Acetyl: needles from Me_2CO . M.p. 175–6°.*Benzoyl*: cryst. from EtOH. M.p. 188–9°.Vesely, Kapp, *Chem. Zentr.*, 1924, II, 2750.**4-Methyl-1-naphthylamine** (4-Amino-1-methylnaphthalene).Needles from pet. ether. M.p. 51–2°. Sol. usual org. solvents. Mod. sol. pet. ether. Spar. sol. H_2O . $FeCl_3 \rightarrow$ green col. $B.HCl$: needles. M.p. 233–4°. Sol. EtOH. Spar. sol. H_2O .*Acetyl*: needles from EtOH. M.p. 166–7°. Spar. sol. EtOH.*Benzoyl*: needles from AcOH. M.p. 238–9°. Sol. $CHCl_3$. Mod. sol. AcOH. Spar. sol. EtOH, C_6H_6 .Lesser, *Ann.*, 1913, 402, 18.**5-Methyl-1-naphthylamine** (5-Amino-1-methylnaphthalene).

Cryst. M.p. 77–8°.

Acetyl: m.p. 194–5°.*Benzoyl*: m.p. 173–4°.Vesely, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, 24, 611.**6-Methyl-1-naphthylamine** (5-Amino-2-methylnaphthalene).

Violet needles from pet. ether. M.p. 90°.

Acetyl: needles from EtOH. M.p. 160–1°.Vesely, Pač, *Chem. Zentr.*, 1930, II, 1548.**7-Methyl-1-naphthylamine** (8-Amino-2-methylnaphthalene).

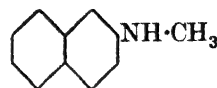
Needles from pet. ether. M.p. 58–9°. Turns brownish-violet in air.

Acetyl: needles from EtOH. M.p. 182–3°.*Benzoyl*: needles from EtOH. M.p. 204°.Vesely, Medvedeva, *Chem. Zentr.*, 1931, II, 3473.Dziewoński, Brand, *Chem. Zentr.*, 1933, I, 775.

See also previous reference.

8-Methyl-1-naphthylamine (8-Amino-1-methylnaphthalene).

Cryst. M.p. 67–8°.

Acetyl: m.p. 183–4°.*Benzoyl*: m.p. 195–6°.Vesely, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, 24, 612.**N-Methyl-2-naphthylamine** (β -Methylaminonaphthalene) $C_{11}H_{11}N$

MW, 157

Oil. B.p. 317°/766 mm., 207°/60 mm., 165–70°/12 mm. Darkens in air.

B,HCl: cryst. from EtOH–Et₂O. M.p. 182–3°.

Acetyl: prisms from pet. ether. M.p. 50–1°.

Benzoyl: needles from pet. ether. M.p. 84°.

p-Toluenesulphonyl: needles from EtOH. M.p. 77–8° (73°).

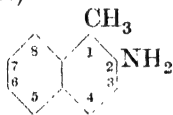
N-Nitroso: needles. M.p. 88°.

Picrate: yellow needles from EtOH. M.p. 145°.

Pschorr, Karo, *Ber.*, 1906, **39**, 3141.

Morgan, Evens, *J. Chem. Soc.*, 1919, **115**, 1141.

1-Methyl-2-naphthylamine (2-Amino-1-methylnaphthalene)



C₁₁H₁₁N MW, 157

Needles from pet. ether. M.p. 51° (49–50°). Sol. EtOH, Et₂O, C₆H₆, CHCl₃, AcOH. Mod. sol. pet. ether. Spar. sol. hot H₂O.

Acetyl: needles from C₆H₆. M.p. 188–9°.

Benzoyl: m.p. 222°.

Fries, Hübner, *Ber.*, 1906, **39**, 444.

Vesely, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, **24**, 611.

3-Methyl-2-naphthylamine (3-Amino-2-methylnaphthalene).

Cryst. from pet. ether. M.p. 135–135.5°.

Acetyl: cryst. from EtOH. M.p. 181–2°.

Benzoyl: cryst. from EtOH. M.p. 189–90°.

Vesely, Štursa, *Chem. Zentr.*, 1934, **I**, 3589.

4-Methyl-2-naphthylamine (3-Amino-1-methylnaphthalene).

Cryst. M.p. 68°.

Acetyl: m.p. 172–3°.

Benzoyl: m.p. 194–5°.

Vesely, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, **24**, 611.

5-Methyl-2-naphthylamine (6-Amino-1-methylnaphthalene).

Cryst. M.p. 63–4°.

Acetyl: m.p. 123–4°.

Benzoyl: m.p. 155–6°.

See previous reference.

6-Methyl-2-naphthylamine (6-Amino-2-methylnaphthalene).

Leaflets from hot H₂O. M.p. 129–30°. Sol. most org. solvents, min. acids. Turns pink in air.

Acetyl: plates from EtOH.Aq. or ligroin. M.p. 160° (155–6°). Very sol. most org. solvents.

Dziewoński, Schoenówna, Waldmann, *Ber.*, 1925, **58**, 1216.

Dziewoński, Brand, *Chem. Zentr.*, 1933, **I**, 775.

7-Methyl-2-naphthylamine (7-Amino-2-methylnaphthalene).

Yellowish-brown cryst. from EtOH. M.p. 105°.

Acetyl: cryst. M.p. 152°.

Vesely, Pác, *Chem. Zentr.*, 1930, **II**, 1548.

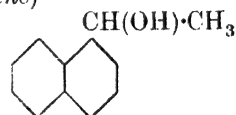
8-Methyl-2-naphthylamine (7-Amino-1-methylnaphthalene).

Needles from MeOH. M.p. 85–6°.

Acetyl: plates from C₆H₆. M.p. 158.5–160° (157–8°).

Vesely, Štursa, *Chem. Zentr.*, 1933, **II**, 378.

Methyl-1-naphthylcarbinol (α -Hydroxy-1-ethylnaphthalene)



C₁₂H₁₂O

MW, 172

l.

Needles. M.p. 47°. B.p. 166°/11 mm. [α]_D²⁰ – 9.79°.

Acetyl: [α]_D²⁰ – 32.28°.

Acid phthalate: oil. [α]_D²⁰ + 43.7° in CHCl₃, + 69.7° in EtOH. *Brucine salt*: needles. M.p. 176°. [α]_D²⁰ + 53.4° in EtOH. *Strychnine salt*: prisms from EtOH. M.p. 191°. [α]_D²⁰ + 11.3° in CHCl₃.

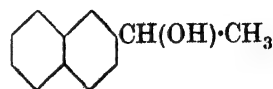
dl.

Needles from pet. ether. M.p. 66°. B.p. 178°/15 mm.

Acid phthalate: cryst. from C₆H₆. M.p. 131–2°.

Pickard, Kenyon, *J. Chem. Soc.*, 1914, **105**, 1126.

Methyl-2-naphthylcarbinol (α -Hydroxy-2-ethylnaphthalene)

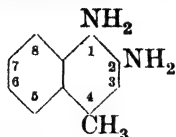


C₁₂H₁₂O

MW, 172

Orange needles. M.p. 67.5–8°. B.p. 178–88°.

Sontag, *Compt. rend.*, 1933, **197**, 1130.

4-Methyl-1 : 2-naphthylenediamine (3 : 4-Diamino-1-methylnaphthalene) $C_{11}H_{12}N_2$

MW, 172

Needles from ligroin. M.p. 91–2°. B.p. 187–95°/14 mm. Sol. usual solvents.

1 : 2-N-Diacetyl : prisms from EtOH. M.p. 261°. Sol. AcOH. Less sol. EtOH.

Vesely, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, 24, 611.

Lesser, *Ann.*, 1913, 402, 27.

5-Methyl-1 : 2-naphthylenediamine (5 : 6-Diamino-1-methylnaphthalene).

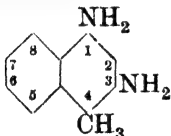
Cryst. M.p. 151–2°.

See first reference above.

7-Methyl-1 : 2-naphthylenediamine (7 : 8-Diamino-2-methylnaphthalene).

Yellow needles from pet. ether. M.p. 80–1°.

Vesely, Pác, *Chem. Zentr.*, 1930, II, 1548.

4-Methyl-1 : 3-naphthylenediamine (2 : 4-Diamino-1-methylnaphthalene) $C_{11}H_{12}N_2$

MW, 172

Yellow cryst. from C_6H_6 -pet. ether. M.p. 93° (63°). Darkens in air.

1 : 3-N-Diacetyl : plates from EtOH. M.p. 303°.

Thompson, *J. Chem. Soc.*, 1932, 1830.

5-Methyl-1 : 3-naphthylenediamine (5 : 7-Diamino-1-methylnaphthalene).

Plates from H_2O . M.p. 123°. Turns brown in air.

1 : 3-N-Diacetyl : needles from AcOH. M.p. 275°.

Atkinson, Thorpe, *J. Chem. Soc.*, 1907, 91, 1702.

6-Methyl-1 : 3-naphthylenediamine (5 : 7-Diamino-2-methylnaphthalene).

Plates from H_2O . M.p. 137°.

1 : 3-N-Diacetyl : needles from AcOH. M.p. 256°.

See previous reference.

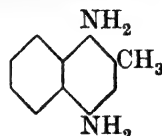
Dict. of Org. Comp.—II.

7-Methyl-1 : 3-naphthylenediamine (6 : 8-Diamino-2-methylnaphthalene).

Plates from H_2O . M.p. 119°.

1 : 3-N-Diacetyl : prisms from AcOH. M.p. 263°.

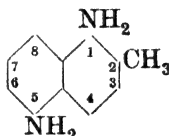
See previous reference.

2-Methyl-1 : 4-naphthylenediamine (1 : 4-Diamino-2-methylnaphthalene) $C_{11}H_{12}N_2$

MW, 172

Yellow cryst. from pet. ether. M.p. 111–13°.

Vesely, Kapp, *Chem. Zentr.*, 1924, II, 2751.

2-Methyl-1 : 5-naphthylenediamine (1 : 5-Diamino-2-methylnaphthalene) $C_{11}H_{12}N_2$

MW, 172

Reddish-yellow needles. M.p. 136° (125–8° decomp.). Sol. H_2O , pet. ether.

$B, 2HI$: m.p. 238–40° decomp.

B, H_2SO_4 : m.p. 255° decomp.

1 : 5-N-Diacetyl : needles. M.p. 202°.

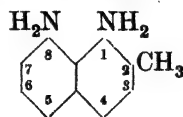
Giral, *Chem. Zentr.*, 1934, II, 940.

See also previous reference.

4-Methyl-1 : 5-naphthylenediamine (4 : 8-Diamino-1-methylnaphthalene).

1 : 5-N-Diacetyl : prisms from EtOH. M.p. 320–3°.

Thompson, *J. Chem. Soc.*, 1932, 2313.

2-Methyl-1 : 8-naphthylenediamine (1 : 8-Diamino-2-methylnaphthalene) $C_{11}H_{12}N_2$

MW, 172

Red cryst. from pet. ether. M.p. 63°. B.p. 213–14°/21 mm.

$B, 2HI$: m.p. 215–20° decomp.

B, H_2SO_4 : m.p. 197°.

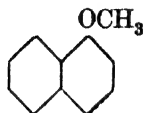
1 : 8-N-Diacetyl : m.p. 136°.

Giral, *Chem. Zentr.*, 1934, II, 940.

4-Methyl-1 : 8-naphthylenediamine (4 : 5-Diamino-1-methylnaphthalene).

Pale pink needles from pet. ether. M.p. 64°. *B, 2HCl*: needles. M.p. 260°.

Thompson, *J. Chem. Soc.*, 1932, 2313.

Methyl 1-naphthyl Ether (α -Methoxynaphthalene)

$C_{11}H_{10}O$ MW, 158

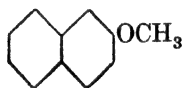
Oil. B.p. 265–6° (258°). Sol. EtOH, Et₂O, C₆H₆, CHCl₃, CS₂. Insol. H₂O. D_4^{20} 1.09636, D_4^{25} 1.07931. n_D^{20} 1.62322, n_D^{25} 1.61341. Volatile in steam.

$C_{11}H_{10}O, C_6H_3(NO_2)_3-1 : 3 : 5$: yellow needles. M.p. 137–8°.

Sabatier, Mailhe, *Compt. rend.*, 1910, 151, 361.

Staedel, *Ann.*, 1883, 217, 42.

Gattermann, *Ann.*, 1888, 244, 72.

Methyl 2-naphthyl Ether (β -Methoxynaphthalene, Nerolin)

$C_{11}H_{10}O$ MW, 158

Plates from Et₂O. M.p. 72°. B.p. 274°. Sol. Et₂O, C₆H₆, CHCl₃. Less sol. CS₂. Spar. sol. MeOH, EtOH. Volatile in steam. Used in perfumery.

$C_{11}H_{10}O, C_6H_3(NO_2)_3-1 : 3 : 5$: yellow needles. M.p. 93–5°.

See previous references and also

Hiers, Hager, *Organic Syntheses*, Collective Vol. I, 51.

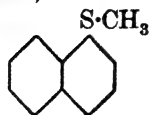
Voss, Blanke, *Ann.*, 1931, 485, 279.

Methyl naphthyl Ketone.

See Acetonaphthone.

α -Methylnaphthylmethylamine.

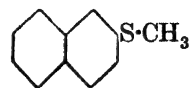
See Naphthyl-ethylamine.

Methyl 1-naphthyl sulphide (1-Thionaphthol methyl ether)

$C_{11}H_{10}S$ MW, 174

B.p. 166–8°/20 mm.

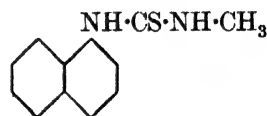
Taboury, *Bull. soc. chim.*, 1904, 31, 1187.

Methyl 2-naphthyl sulphide (2-Thionaphthol methyl ether)

$C_{11}H_{10}S$ MW, 174

Plates from AcOH. M.p. 63–4°. Insol. H₂O. Volatile in steam.

Kehrmann, Sava, *Ber.*, 1912, 45, 2898.

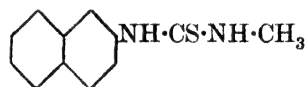
sym.-Methyl-1-naphthylthiourea

$C_{12}H_{12}N_2S$ MW, 216

Plates from EtOH. M.p. 191–2° (198°).

Suter, Moffett, *J. Am. Chem. Soc.*, 1933, 55, 2498.

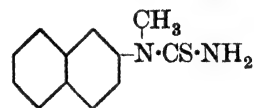
Dyson, Hunter, Morris, *J. Chem. Soc.*, 1932, 2283.

sym.-Methyl-2-naphthylthiourea

$C_{12}H_{12}N_2S$ MW, 216

Prisms from EtOH. M.p. 130°.

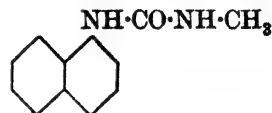
Hunter, Jones, *J. Chem. Soc.*, 1930, 946.

unsym.-Methyl-2-naphthylthiourea

$C_{12}H_{12}N_2S$ MW, 216

Cryst. from AcOEt. M.p. 170°.

See previous reference.

sym.-Methyl-1-naphthylurea

$C_{12}H_{12}ON_2$ MW, 200

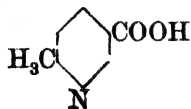
Cryst. from ligroin. M.p. 196–7°.

French, Wirtel, *J. Am. Chem. Soc.*, 1926, 48, 1737.

4-Methylnicotinic Acid.

See Homonicotinic Acid.

6-Methylnicotinic Acid (6-Methylpyridine-3-carboxylic acid, α -picoline-5-carboxylic acid)



$C_7H_7O_2N$ MW, 137

Cryst. from Me_2CO . M.p. 207–8°.

Me ester: $C_8H_9O_2N$. MW, 151. Cryst. M.p. 32°.

Et ester: $C_9H_{11}O_2N$. MW, 165. B.p. 222–4° decomp., about 130°/15 mm.

Amide: $C_7H_8ON_2$. MW, 136. Needles from H_2O . M.p. 194°.

Anilide: $C_{13}H_{12}ON_2$. MW, 212. Needles from EtOH.Aq. M.p. 134–7°.

Nitrile: $C_7H_6N_2$. MW, 118. Cryst. from pet. ether. M.p. 84–5°. B.p. 216–17°/750 mm. Sol. usual org. solvents. Volatile in steam. B, HCl : m.p. 210°. Sol. H_2O , EtOH.

Hydrazide: plates from EtOH. M.p. 133–5°. *Benzylidene deriv.*: needles from EtOH. M.p. 184–5°.

o-Chlorobenzylidene deriv.: needles from EtOH. M.p. 183–4°.

Graf, *J. prakt. Chem.*, 1932, 133, 21.

Räth, Schiffmann, *Ann.*, 1931, 487, 128.

Methylnitramine (Nitraminomethane, N-nitromethylamine)

$CH_3 \cdot NH \cdot NO_2$ MW, 76

Plates from Et_2O . M.p. 38°. Very sol. cold H_2O , EtOH, C_6H_6 , $CHCl_3$. Less sol. Et_2O . Spar. sol. pet. ether. D_4^{20} 1.2433. n_D^{20} 1.46162. Reacts acid. $k = 7.2 \times 10^{-7}$ at 25°.

K salt: needles. M.p. 220°. Explodes on heating.

Diels, Paquin, *Ber.*, 1913, 46, 2013.

Methyl nitrate

$CH_3 \cdot O \cdot NO_2$ MW, 77

B.p. 65°. D_4^{25} 1.2322, D_4^{15} 1.2167, D_4^{25} 1.2032. Vapour explodes on heating.

Delépine, *Bull. soc. chim.*, 1895, 13, 1044.

Methyl nitrite

$CH_3 \cdot O \cdot NO$ MW, 61

B.p. – 12°. D_4^{15} (liq.) 0.991.

Berteni, *Gazz. chim. ital.*, 1882, 12, 438.

Methylnitrolic Acid (Nitromethane oxime, nitroformaldoxime, nitro-oximino-methane, nitro-isonitroso-methane)

$O_2N \cdot CH \cdot N \cdot OH$ MW, 90

Needles from Et_2O or Et_2O -pet. ether. M.p. 68° decomp. Sol. H_2O , EtOH, Et_2O . Alkalis \rightarrow red sol. Decomp. on heating.

v. Meyer, Constam, *Ann.*, 1882, 214, 334.

Wieland, *Ber.*, 1909, 42, 808.

2-Methylnonane (Isodecane)

$CH_3 \cdot [CH_2]_6 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot CH_3$ MW, 142

B.p. 150–60°.

Wurtz, *Jahresber. Fortschr. Chem.*, 1855, 575.

3-Methylnonane

$CH_3 \cdot [CH_2]_5 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot CH_2 \cdot CH_3$ MW, 142

B.p. 165–166.5°/751 mm. D_4^{20} 0.7354. n_D^{20} 1.4126.

Levene, Taylor, *J. Biol. Chem.*, 1922, 54, 356.

4-Methylnonane

$CH_3 \cdot [CH_2]_4 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot CH_2 \cdot CH_2 \cdot CH_3$ MW, 142

B.p. 76°/30 mm. D_4^{27} 0.726. $[\alpha]_D^{27} - 2.21^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1932, 95, 23.

5-Methylnonane

$CH_3 \cdot [CH_2]_3 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot [CH_2]_3 \cdot CH_3$ MW, 142

B.p. 164–6°/755 mm. D_4^{20} 0.7319. n_D^{20} 1.4116.

Levene, Taylor, *J. Biol. Chem.*, 1922, 54, 357.

Methylnonanol-1.

See Methylnonyl Alcohol.

2-Methylnonanol-3.

See Isopropyl-*n*-hexylcarbinol.

2-Methylnonanol-4.

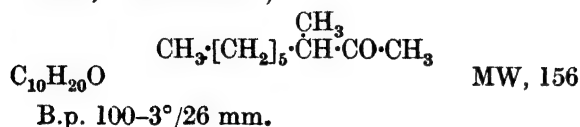
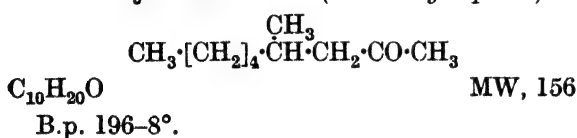
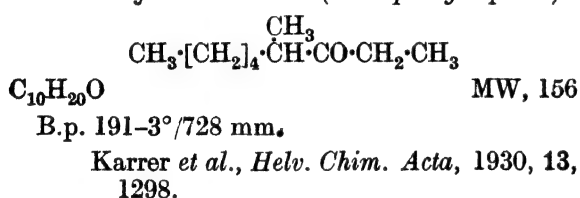
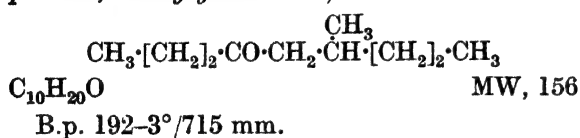
See Isobutyl-*n*-amylcarbinol.

4-Methylnonanol-4.

See Methylpropylamylcarbinol.

5-Methylnonan-5.

See Methylidibutylcarbinol.

2-Methylnonanone-3.See Isopropyl *n*-hexyl Ketone.**2-Methylnonanone-4.**See Isobutyl *n*-amyl Ketone.**3-Methylnonanone-2** (unsym.-Methylhexyl-acetone, 2-aceto-octane)Darzens, *Compt. rend.*, 1905, **141**, 767.**4-Methylnonanone-2** (2-Acetylheptane)Venable, *Ber.*, 1880, **13**, 1651.**4-Methylnonanone-3** (2-Propionylheptane)**4-Methylnonanone-6** (2-Methyl-1-butyryl-pentane, 1-butyrylisoheptane)

See previous reference.

2-Methylnonene-2-dione-6 : 8.

See Acetylmethylheptenone.

4-Methyl-3-nonenone-6.

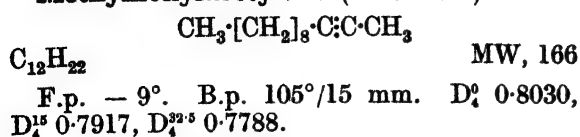
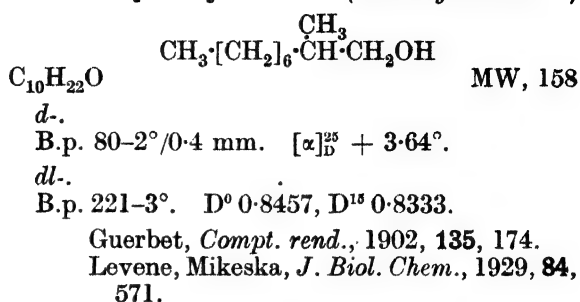
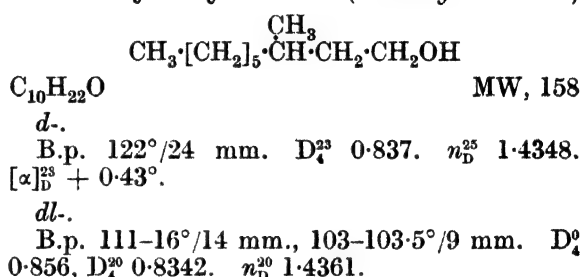
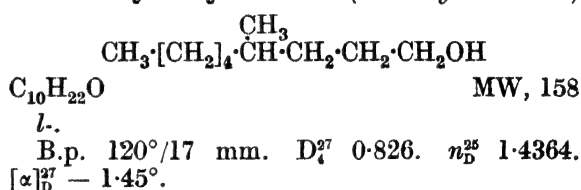
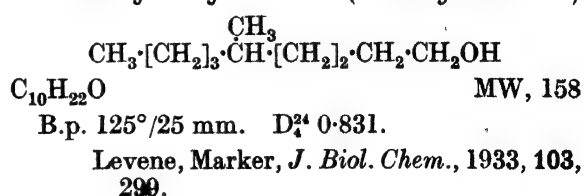
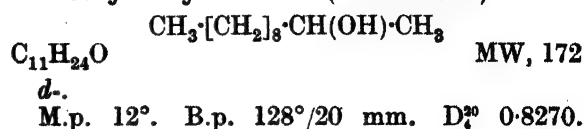
See under Homomesitones.

4-Methyl-4-nonenone-6.

See under Homomesitones.

Methylnonoic Acid.

See Methylpelargonic Acid.

Methylnonylacetylene (2-Dodecine)Krafft, *Ber.*, 1884, **17**, 1372.Krafft, Ruter, *Ber.*, 1892, **25**, 2250.**2-Methylnonyl Alcohol** (2-Methylnonan-1)**3-Methylnonyl Alcohol** (3-Methylnonan-1)Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.Levene, Taylor, *J. Biol. Chem.*, 1922, **54**, 351.Bouveault, Blanc, D.R.P., 164,294,
(*Chem. Zentr.*, 1905, II, 1700).**4-Methylnonyl Alcohol** (4-Methylnonan-1)Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 100.**5-Methylnonyl Alcohol** (5-Methylnonan-1)**Methylnonylcarbinol** (Undecanol-2)

n_D^{20} 1.4369. $[\alpha]_D^{18} + 8.18^\circ$, $[\alpha]_D^{20} + 10.29^\circ$ in C_6H_6 , $+ 8.11^\circ$ in EtOH.

Acetyl: b.p. $84^\circ/15$ mm. D_4^{19} 0.8606, D_4^{25} 0.8309. n_D^{20} 1.4141. $[\alpha]_D^{20} + 6.84^\circ$.

Propionyl: b.p. $150^\circ/24$ mm. D_4^{20} 0.8574. n_D^{20} 1.4277. $[\alpha]_D^{20} + 5.15^\circ$.

Butyryl: b.p. $156^\circ/20$ mm. D_4^{17} 0.8585. n_D^{20} 1.4295. $[\alpha]_D^{20} + 7.31^\circ$.

Valeryl: b.p. $133^\circ/6$ mm. D_4^{16} 0.8577. n_D^{20} 1.4312. $[\alpha]_D^{20} + 7.46^\circ$.

Caproyl: b.p. $135^\circ/4$ mm. D_4^{20} 0.8570. n_D^{20} 1.4334. $[\alpha]_D^{20} + 7.37^\circ$.

Heptyl: b.p. $143^\circ/3$ mm. D_4^{20} 0.8559. n_D^{20} 1.4350. $[\alpha]_D^{20} + 1.17^\circ$.

Pelargonyl: b.p. $168^\circ/4$ mm. D_4^{20} 0.8572. n_D^{20} 1.4389. $[\alpha]_D^{20} + 6.81^\circ$.

Lauryl: b.p. $199^\circ/6$ mm. D_4^{16} 0.8585. n_D^{20} 1.4440. $[\alpha]_D^{20} + 6.19^\circ$.

Myristyl: b.p. $200^\circ/2$ mm. D_4^{14} 0.8593. n_D^{20} 1.4453. $[\alpha]_D^{20} + 5.72^\circ$.

Benzoyl: b.p. $159^\circ/3.5$ mm. $D_4^{18.5}$ 0.9531. n_D^{20} 1.4899. $[\alpha]_D^{20} + 27.55^\circ$.

1-Naphthoyl: b.p. $205^\circ/2.5$ mm. D_4^{16} 1.0067. n_D^{20} 1.5405. $[\alpha]_D^{20} - 1.57^\circ$.

2-Naphthoyl: b.p. $206^\circ/2.5$ mm. D_4^{21} 0.9898. n_D^{20} 1.5376. $[\alpha]_D^{20} + 50.03^\circ$.

Acid phthalate: m.p. $31-2^\circ$. $[\alpha]_D + 37.3^\circ$ in $CHCl_3$, $+ 44.3^\circ$ in EtOH. Brucine salt: m.p. 113° . $[\alpha]_D - 5.2^\circ$ in EtOH. Strychnine salt: m.p. $144-5^\circ$. $[\alpha]_D - 17.1^\circ$ in $CHCl_3$.

l.

B.p. $231-3^\circ$.

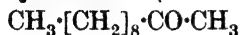
dl.

B.p. $228-9^\circ$, $119^\circ/12$ mm. D^{18} 0.8263. Insol. H_2O .

Pickard, Kenyon, *J. Chem. Soc.*, 1914, 105, 850.

Power, Lees, *J. Chem. Soc.*, 1902, 101, 1593.

Methyl nonyl Ketone (Undecanone-2)



$C_{11}H_{22}O$ MW, 170

Found in palm kernel oil and soya bean oil. Oil. F.p. 15° . B.p. 228° , $105-6^\circ/12$ mm. $D_4^{17.3}$ 0.8295. $n_D^{17.3}$ 1.43002.

Oxime: prisms. M.p. $44-5^\circ$. Sol. EtOH, Et_2O , $CHCl_3$, pet. ether. Insol. H_2O .

Semicarbazone: cryst. from EtOH. M.p. $122-3^\circ$.

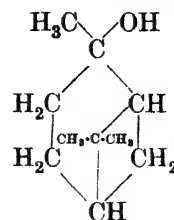
p-Nitrophenylhydrazone: m.p. $90-1^\circ$.

2 : 4-Dinitrophenylhydrazone: orange-yellow cryst. M.p. 63° .

Le Gac, *Chem. Abstracts*, 1930, 24, 3989.

Haller, Lassieur, *Compt. rend.*, 1910, 151, 698.

Methylnopinol (Pinenehydrate)



$C_{10}H_{18}O$

MW, 154

Exists in two stereoisomeric forms.

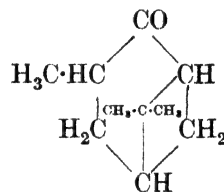
(i) Needles from MeOH. Aq. M.p. $58-9^\circ$. B.p. $240-5^\circ$. $[\alpha]_D^{18} - 4.99^\circ$ in Et_2O . Very volatile.

(ii) Needles from 50% MeOH. M.p. 79° . B.p. $204-5^\circ/721$ mm., $93-5^\circ/13$ mm. $[\alpha]_D - 24.39^\circ$ in Et_2O . Very sol. org. solvents.

Lipp, *Ber.*, 1923, 56, 2104.

Wallach, *Ann.*, 1907, 356, 239.

Methylnopinone



$C_{10}H_{16}O$

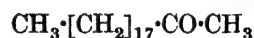
MW, 152

B.p. $215-16^\circ$. Volatile in steam, EtOH, and Et_2O vapours.

Semicarbazone: cryst. from MeOH. M.p. $179-80^\circ$.

Kötz, Lemien, *J. prakt. Chem.*, 1914, 90, 316.

Methyl octadecyl Ketone (Eicosanone-2)



$C_{20}H_{40}O$

MW, 296

Cryst. M.p. 58° . Mod. sol. EtOH, Et_2O , Me_2CO .

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, 44, 108r.

7-Methyloctadiene-2 : 4 (1-Methyl-4-isobutylbutadiene-1 : 3)



$C_{10}H_{16}$

MW, 124

B.p. 149° . D_4^0 0.7653, D_4^{18} 0.7521. n_D^{18} 1.4543.

Reif, *Ber.*, 1908, 41, 2745.

4-Methyloctadiene-3 : 5 (2-Methyl-1 : 4-diethylbutadiene-1 : 3)

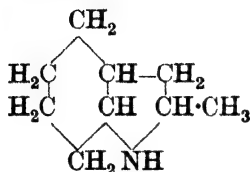


C_9H_{16} MW, 124

B.p. 148–51°. D_4^{25} 0.7640. n_D^{25} 1.46285.

Bjelouss, *Ber.*, 1912, **45**, 626.

2-Methyloctahydroindole



$\text{C}_9\text{H}_{17}\text{N}$ MW, 139

B.p. 187.5–188°. D_4^{25} 0.9103. n_D^{25} 1.4732.

B.HBr: needles from $\text{Me}_2\text{CO}-\text{Et}_2\text{O}$. M.p. 148–9°.

B.HAuCl_4: m.p. 118°.

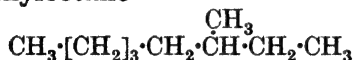
N-Benzenesulphonyl: m.p. 125°.

Picrate: m.p. 178–9° decomp.

Methiodide: m.p. 223–4° decomp.

Fujise, *Chem. Abstracts*, 1929, **23**, 144.

3-Methyloctane



C_9H_{20} MW, 128

d-.

B.p. 142.4–143.4°. D^{17} 0.7206. $[\alpha]_D^{17} + 9.38^\circ$.

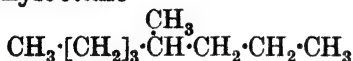
l-.

B.p. 143°. D_4^{27} 0.714. n_D^{25} 1.4052. $[\alpha]_D^{27} - 8.5^\circ$.

Chardin, Sikorsky, *Chem. Zentr.*, 1908, **I**, 2143.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 102.

4-Methyloctane



C_9H_{20} MW, 128

l-.

B.p. 141°. D_4^{19} 0.717. $[\alpha]_D^{19} - 1.06^\circ$.

dl-.

B.p. 141.7–141.9°/771 mm. D_4^{15} 0.7320. n_D^{25} 1.4027.

See last reference above and also

Clarke, *J. Am. Chem. Soc.*, 1912, **34**, 683.

Methyloctanol-1.

See Methyl-*n*-octyl Alcohol.

Methyloctanol-2.

See Methyl-*sec*-.*n*-octyl Alcohol.

2-Methyloctanol-3.

See Isopropyl-*n*-amylcarbinol.

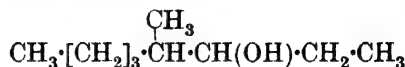
2-Methyloctanol-5.

See Propylisoamylcarbinol.

3-Methyloctanol-3.

See Methyl-ethyl-*n*-amylcarbinol.

4-Methyloctanol-3



$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

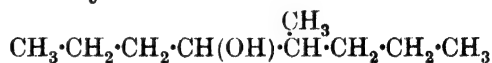
B.p. 132–3°/20 mm. D_{25}^{25} 0.8462. $n_D^{21.3}$ 1.4278.

Green, *J. Am. Chem. Soc.*, 1934, **56**, 1167.

4-Methyloctanol-4.

See Methylpropylbutylcarbinol.

4-Methyloctanol-5



$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

B.p. 74–6°/9 mm. D_4^{25} 0.8156. n_D^{25} 1.42616.

Bjelouss, *Ber.*, 1912, **45**, 628.

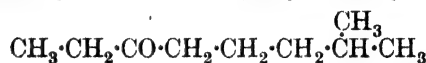
2-Methyloctanone-3.

See Isopropyl *n*-amyl Ketone.

2-Methyloctanone-5.

See Propyl isoamyl Ketone.

2-Methyloctanone-6 (*Ethyl isohexyl ketone*)



$\text{C}_9\text{H}_{18}\text{O}$ MW, 142

B.p. 180–5°. D^{20} 0.8353. n_D 1.47477.

Semicarbazone: m.p. 187–8°.

Thoms, Kahre, *Arch. Pharm.*, 1925, **263**, 241.

3-Methyloctanone-2 (*2-Acetoheptane*)

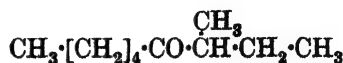


$\text{C}_9\text{H}_{18}\text{O}$ MW, 142

B.p. 64–5°/18 mm. D_4^{27} 0.832. n_D^{27} 1.424.

Powell, Murray, Baldwin, *J. Am. Chem. Soc.*, 1933, **55**, 1153.

3-Methyloctanone-4 (*sec*-.*n*-Butyl *n*-amyl ketone)



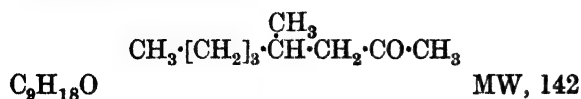
$\text{C}_9\text{H}_{18}\text{O}$ MW, 142

B.p. 174°. D^{14} 0.829. n_D^{14} 1.4200.

Semicarbazone: m.p. 88–90°.

Vavon, Ivanoff, *Compt. rend.*, 1923, **177**, 453.

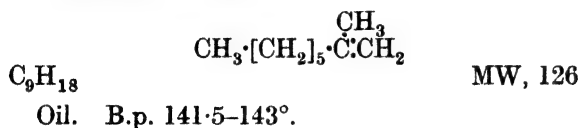
4-Methyloctanone-2 (2-Acetonylhexane)



B.p. 184°/769 mm. D_4^{15} 0.8319.
Semicarbazone: needles from pet. ether. M.p. 75°.

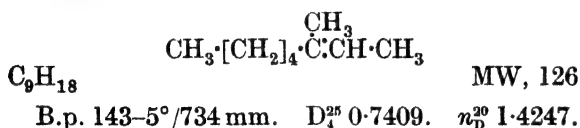
Lees, *J. Chem. Soc.*, 1902, **81**, 1595.

2-Methyl-1-octene (2-Hexylpropylene)



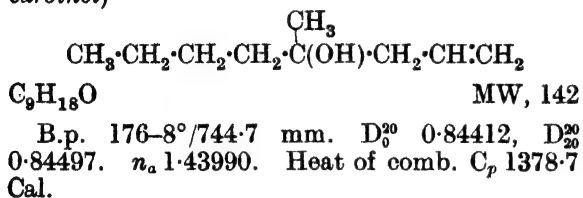
Freund, Schönfeld, *Ber.*, 1891, **24**, 3359.

3-Methyl-2-octene (2-n-Amyl-2-butylene)



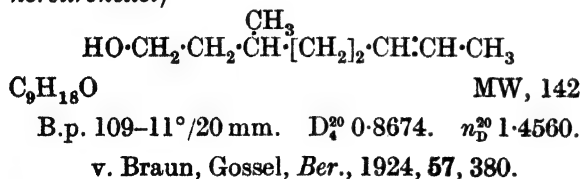
Whitmore, Williams, *J. Am. Chem. Soc.*, 1933, **55**, 409.

4-Methyl-1-octenol-4 (Methylbutylallyl-carbinol)

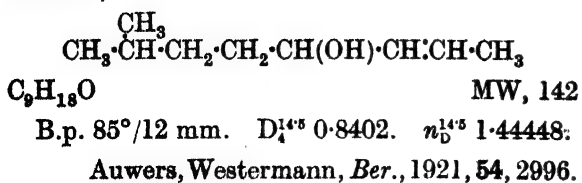


Taliew, *Chem. Zentr.*, 1901, **I**, 997.

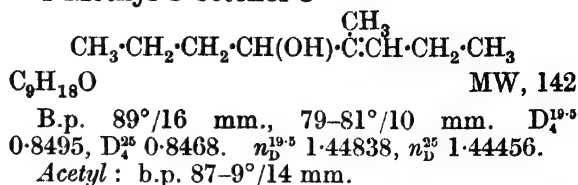
6-Methyl-2-octenol-8 (3-Methyl-6-octenol-1, norcitronellol)



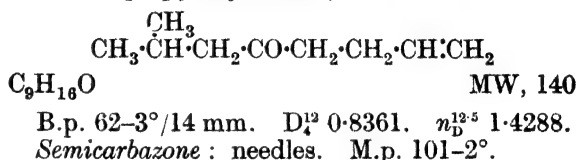
7-Methyl-2-octenol-4 (Isoamylpropenyl-carbinol)



4-Methyl-3-octenol-5

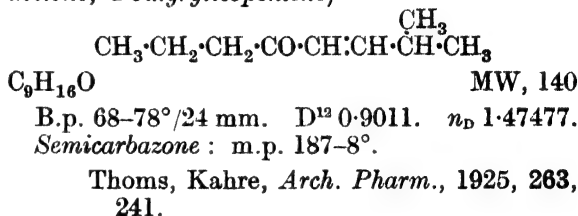


See previous reference and also
 Bjelouss, *Ber.*, 1912, **45**, 625.

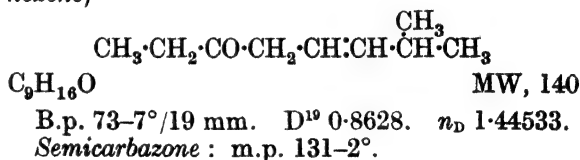
7-Methyl-1-octenone-5 (Isobutyl γ -butenyl ketone, isopropylallylacetone)

Helferich, Keiner, *Ber.*, 1924, **57**, 1619.

2-Methyl-3-octenone-5 (Ethylisobutylideneacetone, 4-butyrylisopentene)

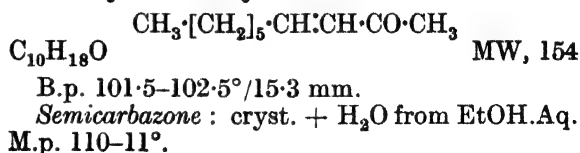


2-Methyl-3-octenone-6 (1-Propionyl-2-isohexene)



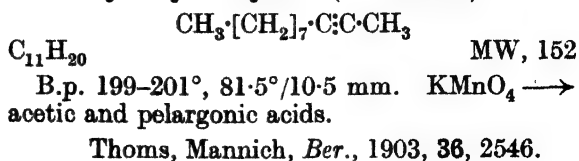
See previous reference.

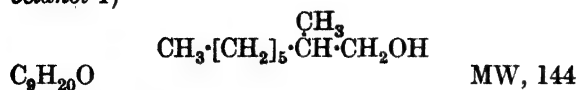
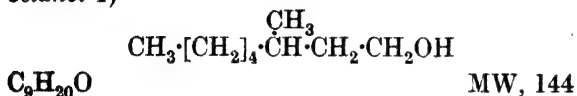
Methyl 1-octenyl Ketone



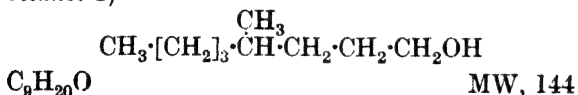
Murakami, *Chem. Abstracts*, 1930, **24**, 2426.

Methyloctylacetylene (2-Undecine)



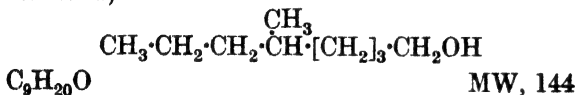
2-Methyl-*n*-octyl Alcohol (2-Methyl-octanol-1)B.p. 98–9°/16 mm. D_4^{20} 0.8418.Bouveault, Blanc, *Bull. soc. chim.*, 1904, 31, 748.**3-Methyl-*n*-octyl Alcohol** (3-Methyl-octanol-1)

l.
B.p. 110°/25 mm. D_4^{24} 0.827. n_D^{25} 1.4328.
[α] $_D^{24}$ – 3.74°.

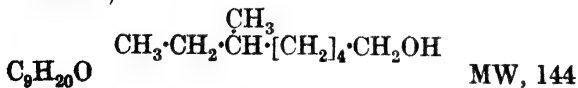
Levene, Marker, *J. Biol. Chem.*, 1931, 91, 77.**4-Methyl-*n*-octyl Alcohol** (4-Methyl-octanol-1)

l.
B.p. 106°/17 mm. $D_4^{27.5}$ 0.820. n_D^{25} 1.4335.
[α] $_D^{27.5}$ – 0.45°.

See previous reference.

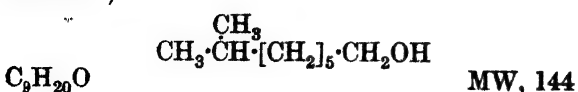
5-Methyl-*n*-octyl Alcohol (5-Methyl-octanol-1)

l.
B.p. 110°/25 mm. D_4^{24} 0.828.

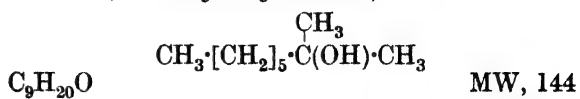
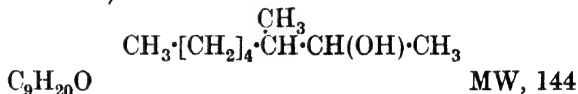
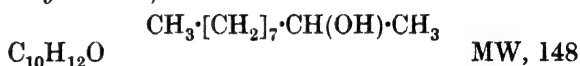
Levene, Marker, *J. Biol. Chem.*, 1933, 103, 299.**6-Methyl-*n*-octyl Alcohol** (6-Methyl-octanol-1)

d.
B.p. 100°/20 mm. D_4^{24} 0.828.

See previous reference.

7-Methyl-*n*-octyl Alcohol (7-Methyl-octanol-1)B.p. 206°/761 mm. D^{25} 0.8260.

Phenylurethane: m.p. 66.4°.

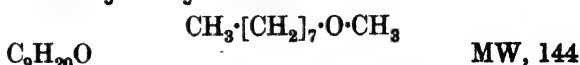
Levene, Allen, *J. Biol. Chem.*, 1916, 27, 448.**2-Methyl-sec.-*n*-octyl Alcohol** (2-Methyl-octanol-2, dimethylhexylcarbinol)B.p. 79–80°/12 mm. D^{19} 0.823. n_D^{19} 1.4299.Kirmann, *Compt. rend.*, 1927, 184, 1463.**3-Methyl-sec.-*n*-octyl Alcohol** (3-Methyl-octanol-2)B.p. 75°/15 mm. D_4^{27} 0.831. n_D^{27} 1.437.Powell, Murray, Baldwin, *J. Am. Chem. Soc.*, 1933, 55, 1153.**Methyloctylcarbinol** (Decanol-2, sec.-*n*-decyl alcohol)

d.
B.p. 210°, 110–11°/11 mm. D_4^{20} 0.8250. n_D^{20} 1.4344. [α] $_D^{17}$ + 8.74°, [α] $_D^{20}$ + 11.46° in C_6H_6 , + 8.89° in EtOH.

Acetyl: b.p. 115°/15 mm. D_4^{20} 0.8597. n_D^{20} 1.4223. [α] $_D^{20}$ + 5.64°.Lauryl: b.p. 190°/4 mm. D_4^{15} 0.8598. n_D^{20} 1.4426. [α] $_D^{20}$ + 6.41°.1-Naphthoyl: b.p. 195°/2.5 mm. D_4^{16} 1.0067. n_D^{20} 1.5405. [α] $_D^{16}$ – 1.57°.Acid phthalate: m.p. 38–9°. [α] $_D$ + 39.0° in CHCl_3 , + 45.2° in EtOH. Brucine salt: m.p. 136–8°. [α] $_D$ – 6.0° in EtOH. Strychnine salt: m.p. 136–7°. [α] $_D$ – 18.4° in CHCl_3 .*dl.*

B.p. 210–11°.

1-Naphthylurethane: cryst. from EtOH. M.p. 69°.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, 99, 55; 1914, 105, 852.**Methyl octyl Ether**B.p. 158°, 75°/20 mm. D_4^{20} 0.802.Bouveault, Blanc, *Bull. soc. chim.*, 1904, 31, 673.Cerchez, *Bull. soc. chim.*, 1928, 43, 762.

Methyl octyl Ketone (Decanone-2, 2-keto-decane)
$$\text{CH}_3 \cdot [\text{CH}_2]_7 \cdot \text{CO} \cdot \text{CH}_3$$

$$\text{C}_{10}\text{H}_{20}\text{O} \quad \text{MW, 156}$$

Found in oil of rue. Needles. M.p. 14° (2-5°). B.p. 209°/750 mm., 95-7°/12 mm. D_4^{25} 0.8230. n_D^{25} 1.4263.

Semicarbazone: plates from EtOH. M.p. 126° (121°).

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108T.

Ruzicka, Brugger, *Helv. Chim. Acta*, 1926, **9**, 397.

Murakami, *Chem. Abstracts*, 1930, **24**, 2426.

Rupe, Willi, *Helv. Chim. Acta*, 1932, **15**, 845.

Methylolacetamide.

See *N*-Hydroxymethylacetamide.

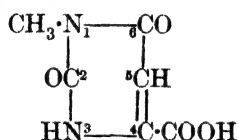
Methylolurea (Hydroxymethylurea)
$$\text{NH}_2 \cdot \text{CO} \cdot \text{NH} \cdot \text{CH}_2\text{OH}$$

$$\text{C}_2\text{H}_6\text{O}_2\text{N}_2 \quad \text{MW, 90}$$

Prisms from EtOH. M.p. 111°. Very sol. cold H_2O . Sol. MeOH. Insol. Et_2O .

Einhorn, Hamburger, *Ber.*, 1908, **41**, 27.

Dixon, *J. Chem. Soc.*, 1918, **113**, 246.

1-Methylorotic Acid (1-Methyluracil-4-carboxylic acid)

$$\text{C}_6\text{H}_6\text{O}_4\text{N}_2 \quad \text{MW, 170}$$

Cryst. M.p. 310°.

Me ester: $\text{C}_7\text{H}_8\text{O}_4\text{N}_2$. MW, 184. Prisms from H_2O . M.p. 140-1°.

Et ester: $\text{C}_8\text{H}_{10}\text{O}_4\text{N}_2$. MW, 198. Prisms from H_2O . M.p. 139.5°. Sol. H_2O , EtOH, AcOH. Spar. sol. C_6H_6 .

Bachstetz, *Ber.*, 1931, **64**, 2687.

3-Methylorotic Acid (3-Methyluracil-4-carboxylic acid).

Cryst. M.p. 250°.

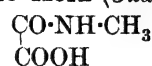
See previous reference.

Methyloxalacetic Acid.

See 1-Oxalopropionic Acid.

***N*-Methyloxamethane.**

See under Methyloxamic Acid.

Methyloxamic Acid (Oxalic methylamide)

$$\text{C}_3\text{H}_5\text{O}_3\text{N} \quad \text{MW, 103}$$

Cryst. from H_2O or EtOH. M.p. 145-6°. Sublimes. Volatile in steam.

Me ester: $\text{C}_4\text{H}_7\text{O}_3\text{N}$. MW, 117. Prisms from MeOH. M.p. 85°. Sol. H_2O , MeOH. Spar. sol. Et_2O .

Et ester: *N*-methyloxamethane. $\text{C}_5\text{H}_9\text{O}_3\text{N}$. MW, 131. Plates. M.p. 24°. B.p. 242-3°. Sol. H_2O , EtOH, Et_2O .

Amide: *N*-methyloxamide. $\text{C}_3\text{H}_6\text{O}_2\text{N}_2$. MW, 102. Needles from EtOH.Aq. M.p. 231-2°. Spar. sol. hot H_2O , EtOH, Et_2O . Sublimes.

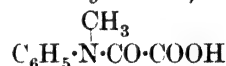
Hantzsch, *Ber.*, 1884, **17**, 2919.

Whiteley, *J. Chem. Soc.*, 1903, **83**, 19.

Tierie, *Rec. trav. chim.*, 1933, **52**, 357.

***N*-Methyloxamide.**

See under Methyloxamic Acid.

***N*-Methyloxanilic Acid** (Methylphenyloxamic acid, oxalomethylaniline)

$$\text{C}_9\text{H}_9\text{O}_3\text{N} \quad \text{MW, 179}$$

Prisms + H_2O from H_2O . M.p. 82-83.5°, anhyd. 120° decomp.

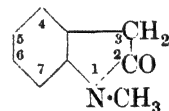
Me ester: $\text{C}_{10}\text{H}_{11}\text{O}_3\text{N}$. MW, 193. Yellow liq. B.p. 170-5°/13 mm. Insol. pet. ether.

Chloride: $\text{C}_9\text{H}_8\text{O}_2\text{NCl}$. MW, 197.5. Cryst. M.p. 30°.

Anilide: cryst. from EtOH. M.p. 106°.

Guareschi, *Ber.*, 1893, **26**, *Ref.*, 93.

Lander, *J. Chem. Soc.*, 1904, **85**, 988.

1-Methyloxindole

$$\text{C}_9\text{H}_9\text{ON} \quad \text{MW, 147}$$

Needles from H_2O or ligroin. M.p. 89°. Sol. H_2O , EtOH, Et_2O , Me_2CO , C_6H_6 .

Colman, *Ann.*, 1888, **248**, 120.

Hinsberg, Rosenzweig, *Ber.*, 1894, **27**, 3257.

Stollé, D.R.P., 335,763, (*Chem. Zentr.*, 1921, II, 1065).

3-Methyloxindole.

See Atroxindole.

5-Methyloxindole.

Needles from C_6H_6 . M.p. 168°.

Stollé et al., *J. prakt. Chem.*, 1930, **128**, 1.

7-Methyloxindole.

Needles from C_6H_6 . M.p. about 200° . Sol. EtOH. Mod. sol. hot H_2O , Et_2O , C_6H_6 .

See previous reference.

1-Methylpalmitic Acid

$CH_3 \cdot [CH_2]_{13} \cdot \overset{CH_3}{\underset{|}{CH}} \cdot COOH$
 $C_{17}H_{34}O_2$ MW, 270
 M.p. 54° ($45.5-47.5^\circ$). B.p. $174-7^\circ/1-2$ mm.
 Greer, Adams, *J. Am. Chem. Soc.*, 1930, 52, 2542.

Methylparabanic Acid (Oxalylmethylurea)

$CH_3 \cdot N \begin{array}{c} \text{---} CO \\ | \\ OC \\ | \\ HN \text{---} CO \end{array}$
 $C_4H_4O_3N_2$ MW, 128
 Plates from H_2O . M.p. $153-4^\circ$. Very sol. EtOH, MeOH. Sol. H_2O , AcOEt. Spar. sol. Et_2O , $CHCl_3$, C_6H_6 . Insol. pet. ether.
 N-Acetyl: cryst. from AcOH. M.p. $183-5^\circ$.
 Biltz, Topp, *Ber.*, 1913, 46, 1393.

1-Methylpelargonic Acid (1-Methylnonoic acid)

$CH_3 \cdot [CH_2]_6 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot COOH$
 $C_{10}H_{20}O_2$ MW, 172
d.
 B.p. $145-7^\circ/4$ mm. $[\alpha]_D^{25} + 8.34^\circ$.
 Chloride: $C_{10}H_{19}OCl$. MW, 190.5. B.p. $73-4^\circ/1$ mm. $[\alpha]_D^{25} + 4.89^\circ$.
 Amide: $C_{10}H_{21}ON$. MW, 171. Cryst. from 50% EtOH. M.p. 78° . $[\alpha]_D^{25} + 7.07^\circ$ in 95% EtOH.
 Nitrile: $C_{10}H_{19}N$. MW, 153. B.p. $85-94^\circ/7$ mm. $[\alpha]_D^{25} + 13.61^\circ$.
l.
 B.p. $115^\circ/1$ mm. $D_4^{25} 0.895$. $[\alpha]_D^{25} - 8.72^\circ$ in Et_2O . $n_D^{25} 1.4312$.
 Et ester: $C_{12}H_{24}O_2$. MW, 200. $[\alpha]_D^{25} - 8.60^\circ$.

dl.

B.p. $261-5^\circ$. $D_0 0.9127$.

Amide: needles from EtOH. M.p. 76° .

Levene, Mikeska, *J. Biol. Chem.*, 1929, 84, 571.

Levene, Marker, *J. Biol. Chem.*, 1932, 98, 1.

Guerbet, *Compt. rend.*, 1902, 135, 174.

2-Methylpelargonic Acid (2-Methylnonoic acid)

$CH_3 \cdot [CH_2]_5 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot CH_2 \cdot COOH$
 $C_{10}H_{20}O_2$ MW, 172

d.

B.p. $133^\circ/8$ mm. $D_4^{25} 0.899$. $n_D^{25} 1.4339$. $[\alpha]_D^{25} + 0.78^\circ$.

Et ester: $C_{12}H_{24}O_2$. MW, 200. B.p. $135^\circ/36$ mm. $D_4^{25} 0.862$. $n_D^{25} 1.4232$

dl.

B.p. $147-8^\circ/12$ mm. $D_4^{25} 0.9012$. $n_D^{25} 1.4342$.
 Et ester: b.p. $115^\circ/13$ mm. $D_4^{25} 0.8653$. $n_D^{25} 1.4240$.

Levene, Taylor, *J. Biol. Chem.*, 1922, 54, 351.

Levene, Marker, *J. Biol. Chem.*, 1931, 91, 77.

3-Methylpelargonic Acid (3-Methylnonoic acid)

$CH_3 \cdot [CH_2]_4 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot CH_2 \cdot CH_2 \cdot COOH$
 $C_{10}H_{20}O_2$ MW, 172
l.
 B.p. $156^\circ/22$ mm. $D_4^{25} 0.871$. $[\alpha]_D^{25} - 0.59^\circ$.
 Et ester: $C_{12}H_{24}O_2$. MW, 200. B.p. $120^\circ/22$ mm. $D_4^{25} 0.862$. $[\alpha]_D^{25} - 0.12^\circ$.
 Levene, Marker, *J. Biol. Chem.*, 1932, 95, 153.

4-Methylpelargonic Acid (4-Methylnonoic acid)

$CH_3 \cdot [CH_2]_3 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot [CH_2]_3 \cdot COOH$
 $C_{10}H_{20}O_2$ MW, 172
l.
 B.p. $149^\circ/22$ mm. $D_4^{25} 0.871$. $[\alpha]_D^{25} - 1.33^\circ$.
 Et ester: $C_{12}H_{24}O_2$. MW, 200. B.p. $125^\circ/25$ mm. $D_4^{25} 0.862$. $[M]_D^{24} - 2.84^\circ$.
 Levene, Marker, *J. Biol. Chem.*, 1933, 103, 304.

7-Methylpelargonic Acid (7-Methylnonoic acid, isocapric acid)

$CH_3 \cdot \overset{CH_3}{\underset{|}{CH}} \cdot [CH_2]_6 \cdot COOH$
 $C_{10}H_{20}O_2$ MW, 172
 B.p. 155.6° . Solid at room temp.
 Levene, Allen, *J. Biol. Chem.*, 1916, 27, 462.

6-Methylpentadecanol-6 (Methylamylnonylcarbinol)

$CH_3 \cdot [CH_2]_7 \cdot \overset{CH_3}{\underset{|}{C}}(OH) \cdot [CH_2]_4 \cdot CH_3$
 $C_{16}H_{34}O$ MW, 242

7-Methylpentadecanol-9

B.p. 199–200°/50 mm. D_4^{25} 0.8316. n_D^{25} 1.4446.

Davies, Dixon, Jones, *J. Chem. Soc.*, 1930, 470.

7-Methylpentadecanol-9 (*Hexyl-2-methyloctyl-carbinol*)

$\text{CH}_3 \cdot [\text{CH}_2]_5 \cdot \text{CH}(\text{OH}) \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot [\text{CH}_2]_5 \cdot \text{CH}_3$
 $\text{C}_{16}\text{H}_{34}\text{O}$ MW, 242

B.p. 180°/18 mm. D_4^{15} 0.8351.

Guerbet, *Bull. soc. chim.*, 1912, 11, 282.

7-Methylpentadecanone-9 (*Hexyl 2-methyloctyl ketone, 2-methyl-1-heptylglyoctane*)

$\text{CH}_3 \cdot [\text{CH}_2]_5 \cdot \text{CO} \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot [\text{CH}_2]_5 \cdot \text{CH}_3$
 $\text{C}_{16}\text{H}_{32}\text{O}$ MW, 240

B.p. 172–4°/21 mm. D_4^0 0.846.

Semicarbazone: cryst. M.p. 195–7°.

Guerbet, *Bull. soc. chim.*, 1910, 7, 633.

Methylpentadecylcarbinol.

See Heptadecanol-2.

14-Methylpentadecylic Acid.

See Isopalmitic Acid.

Methylpentadecyl Ketone (*Heptadecanone-2*)

$\text{CH}_3 \cdot [\text{CH}_2]_{14} \cdot \text{CO} \cdot \text{CH}_3$
 $\text{C}_{17}\text{H}_{34}\text{O}$ MW, 254

Cryst. M.p. 48°. B.p. 319–20°, 246°/110 mm. D_4^{25} 0.8140. Very sol. CHCl_3 , Et_2O , C_6H_6 . Sol. Me_2CO , pet. ether. Spar. sol. EtOH .

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, 44, 109t.

4-Methyl-1 : 2-pentadiene (*Isopropylallene, isobutylidene-ethylene*)

$\text{CH}_3 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH} : \text{C} : \text{CH}_2$
 C_6H_{10} MW, 82

B.p. 70°. D_4^{22} 0.7061. n_D^{22} 1.4232.

Bouis, *Ann. chim.*, 1928, 9, 432.

2-Methyl-1 : 3-pentadiene (*1 : 3-Dimethyl-1 : 3-butadiene, 2-propenylpropylene*)

$\text{CH}_3 \cdot \text{CH} : \text{CH} \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} : \text{CH}_2$
 C_6H_{10} MW, 82

B.p. 75.9–76°/765 mm. D_4^{25} 0.7141. n_D^{25} 1.4466.

Farmer, Warren, *J. Chem. Soc.*, 1931, 3225.

779 2-Methylpentane-4 : 4-dicarboxylic Acid

3-Methyl-1 : 3-pentadiene (*1 : 2-Dimethyl-1 : 3-butadiene, 3-propylidene-1-butylene, 2-vinyl-2-butylene*)

$\text{CH}_3 \cdot \text{CH} : \overset{\text{CH}_3}{\underset{|}{\text{C}}} : \text{CH} : \text{CH}_2$
 C_6H_{10} MW, 82

B.p. 78–78.3°. D_4^{25} 0.7250. n_D^{25} 1.4494.

Farmer, Warren, *J. Chem. Soc.*, 1931, 3225.

4-Methyl-1 : 3-pentadiene (*1-Vinylisobutylene, 1 : 1-dimethyl-1 : 3-butadiene, 3-isopropylidenepropylene*)

$\text{CH}_3 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} : \text{CH} : \text{CH} : \text{CH}_2$
 C_6H_{10} MW, 82

B.p. 76.4–76.9°/758.4 mm. D_4^{20} 0.7183. n_D^{20} 1.4525.

See previous reference.

Methyl-1 : 3-pentadiene-1-carboxylic Acid.

See Methylsorbic Acid.

Methyl 1 : 3-pentadienyl Ketone.

See 2 : 4-Heptadienone-6.

Methylpentamethylene-arsine.

See 1-Methylarsepidine.

Methyl-pentamethylene-glutaric Acid.

See Methylcyclohexane-diacetic Acid.

1-Methylpentamethylene Glycol.

See Hexandiol-1 : 5.

2-Methylpentandione-3 : 4.

See Acetylisobutyryl.

3-Methylpentandione-2 : 4.

See Methylacetylacetone.

2-Methylpentane.

See Isohexane.

3-Methylpentane (*Methyldiethylmethane, 1 : 1-diethylethane*)

$\text{CH}_3 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{C}}} \cdot \text{CH}_2 \cdot \text{CH}_3$
 C_8H_{18} MW, 86

B.p. 63.2°. D_4^0 0.6820, D_4^{15} 0.6687. n_D^{15} 1.37929.

Risseghem, *Bull. soc. chim. Belg.*, 1921, 30, 14.

Methylpentane-1 : 5-dicarboxylic Acid.

See Methylpimelic Acid.

2-Methylpentane-1 : 3-dicarboxylic Acid.

See 2-Methyl-3-ethylglutaric Acid.

2-Methylpentane-3 : 5-dicarboxylic Acid.

See 1-Isopropylglutaric Acid.

2-Methylpentane-4 : 4-dicarboxylic Acid.

See Methylisobutylmalonic Acid.

2-Methylpentane-5:5-dicarboxylic Acid.

See Isoamylmalonic Acid.

1-Methylpentanol-1.See Methyl-*n*-butylcarbinol.**2-Methylpentanol-1.**See 2-Methyl-*n*-amyl Alcohol.**2-Methylpentanol-2.**

See Dimethylpropylcarbinol.

2-Methylpentanol-3.

See Ethylisopropylcarbinol.

2-Methylpentanol-4.

See Methylisobutylcarbinol.

3-Methylpentanol-1.See 3-Methyl-*n*-amyl Alcohol.**3-Methylpentanol-2.**See Methyl-*sec*.-*n*-butylcarbinol.**3-Methylpentanol-3.**

See Methyl-diethylcarbinol.

4-Methylpentanol-1.

See Isohexyl Alcohol.

2-Methyl-2-pentanolone-4.

See Diacetone Alcohol.

2-Methylpentanone-3.

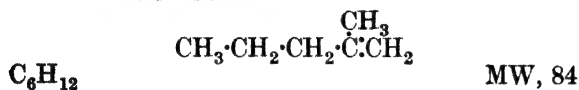
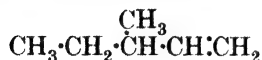
See Ethyl isopropyl Ketone.

2-Methylpentanone-4.

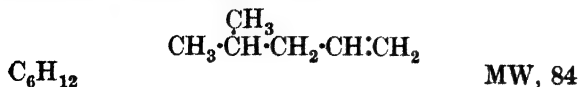
See Methyl isobutyl Ketone.

3-Methylpentanone-2.See Methyl *sec*.-*n*-butyl Ketone.**1-Methyl-1-pentenal.**

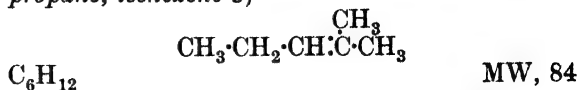
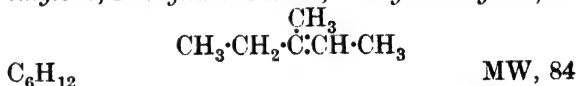
See 1-Methyl-2-ethylacrolein.

2-Methyl-1-pentene (1-Methyl-1-propylethylene, 2-propylpropylene)B.p. 61.5–62°. D_4^{20} 0.6817. n_D^{20} 1.3921.Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, 54, 754.**3-Methyl-1-pentene** (*sec*.-*n*-Butylethylene, 3-ethyl-1-butylene, 2-vinylbutane)B.p. 53.6–54°. D_4^{20} 0.6700. n_D^{20} 1.3835.

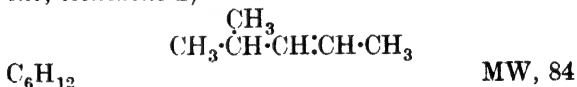
See previous reference.

4-Methyl-1-pentene (Isobutylethylene, isohexene-1, 3-isopropylpropylene)B.p. 53.6–53.9°. D_4^{20} 0.6646. n_D^{20} 1.3825.

See previous reference.

2-Methyl-2-pentene (1:1-Dimethyl-2-ethylethylene, 1-isopropylidenepropene, 2-propylidenepropene, isohexene-3)B.p. 67.2–67.5°. D_4^{20} 0.6904. n_D^{20} 1.4005.Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, 54, 754.**3-Methyl-2-pentene** (1:2-Dimethyl-1-ethylethylene, 2-ethylidenobutane, 2-ethyl-2-butylene)B.p. 67.6–68.2°. D_4^{20} 0.6956. n_D^{20} 1.4002.

See previous reference.

4-Methyl-2-pentene (1-Methyl-2-isopropylethylene, 1-ethylidencisobutane, 1-isopropylpropylene, isohexene-2)B.p. 57.7–58.5°. D_4^{20} 0.6709. n_D^{20} 1.3885.

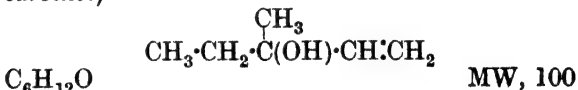
See previous reference.

2-Methyl-1-pentene-1:3-dicarboxylic Acid.

See 2-Methyl-3-ethylglutaconic Acid.

2-Methyl-1-pentenic Acid.

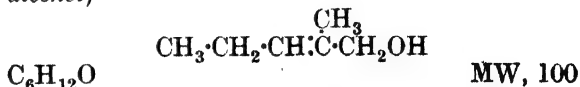
See 2-Methyl-2-ethylacrylic Acid.

3-Methyl-1-pentenol-3 (Methylethylvinylcarbinol)

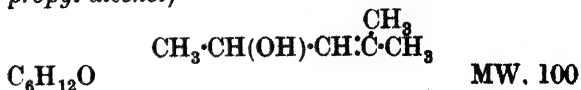
B.p. 114–16°.

Bayer, D.R.P., 288,271, (*Chem. Zentr.*, 1915, II, 1223).**4-Methyl-1-pentenol-4.**

See Dimethylallylcarbinol.

2-Methyl-2-pentenol-1 (2-Propylidenepropyl alcohol)

B.p. 166–9°.

Skita, *Ber.*, 1915, 48, 1491.**2-Methyl-2-pentenol-4** (Isopropylideneisopropyl alcohol)

B.p. 130°, 65°/38 mm.

Et ether: $C_8H_{16}O$. MW, 128. B.p. 124–6°. D_4^{20} 0.8084.

Kyriakides, *J. Am. Chem. Soc.*, 1914, **36**, 994.

Ipatjew, *J. prakt. Chem.*, 1899, **59**, 536.

2-Methyl-2-pentenol-5 (3-Isopropylidene-propyl alcohol)

$C_6H_{12}O$ $HO-CH_2-CH_2-CH:\overset{CH_3}{C}-CH_3$ MW, 100
B.p. 157–8°/771 mm. D_{20}^{20} 0.8615. n_D^{20} 1.44416.

Et ether: $C_8H_{16}O$. MW, 128. B.p. 142.5°/766 mm. D_4^{20} 0.7975. n_D^{20} 1.4182.

Van Aevde, *Rec. trav. chim.*, 1909, **28**, 172.

Kishner, Klawikordow, *Chem. Zentr.*, 1911, II, 363.

3-Methyl-2-pentenol-4

$C_6H_{12}O$ $CH_3-CH(OH)-\overset{CH_3}{C}-CH-CH_3$ MW, 100
B.p. 139–41°, 84–6°/88 mm. D_4^{20} 0.8793. $n_D^{17.5}$ 1.4428.

Abelmann, *Ber.*, 1910, **43**, 1579.

4-Methyl-2-pentenol-1 (3-Isopropylallyl alcohol)

$C_6H_{12}O$ $CH_3-\overset{CH_3}{CH}-CH:CH-CH_2OH$ MW, 100
B.p. 158–60°. D_4^{16} 0.8490. n_D^{16} 1.4403.
Acetyl: b.p. 171–3°. D_4^{18} 0.8976. n_D^{18} 1.4282.

Bouis, *Ann. chim.*, 1928, **9**, 402.

4-Methyl-2-pentenol-4.

See Dimethylpropenylcarbinol.

2-Methyl-1-pentenone-3 (*Ethyl isopropenyl ketone*, 2-propionylpropylene)

$C_6H_{10}O$ $CH_3-CH_2-CO-\overset{CH_3}{C}-CH_2$ MW, 98
B.p. 117–19°.
Semicarbazone: leaflets. M.p. 158–9°.

Mannich, *Arch. Pharm.*, 1917, **255**, 269.

2-Methyl-1-pentenone-4 (*Isopropenylacetone*, 3-acetoisobutylene)

$C_6H_{10}O$ $CH_3-CO-CH_2-\overset{CH_3}{C}-CH_2$ MW, 98
B.p. 135–45° decomp.
Semicarbazone: cryst. M.p. 192°.
v. Braun, *Ann.*, 1912, **386**, 303.

2-Methyl-2-pentenone-4.

See Mesityl oxide.

3-Methyl-2-pentenone-4 (2-Aceto-2-butylene)

$C_6H_{10}O$ $CH_3-CO-\overset{CH_3}{C}-CH-CH_3$ MW, 98

B.p. 138°.

Oxime: needles. M.p. 75–6°.

Semicarbazone: needles. M.p. 201°.

Hinkel, Ayling, Dippy, Angel, *J. Chem. Soc.*, 1931, 818.

Methyl-4-pentenylcarbinol.

See 1-Heptenol-6.

1-Methyl-2-β-pentenylcyclopentenone-3.

See Jasmone.

Methyl 1-pentenyl Ketone.

See 3-Heptenone-2.

Methyl 2-pentenyl Ketone.

See 3-Heptenone-6.

Methyl 3-pentenyl Ketone.

See 2-Heptenone-6.

Methyl 4-pentenyl Ketone.

See 1-Heptenone-6.

4-Methylpentene-1.

See Isobutylacetylene.

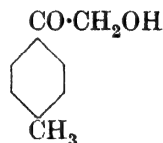
4-Methylpentene-2.

See Methylisopropylacetylene.

N-Methylphenacetin.

See under N-Methyl-p-phenetidine.

p-Methylphenacyl Alcohol (ω-Hydroxy-4-methylacetophenone, hydroxymethyl p-tolyl ketone, p-tolylcarbinol)



$C_9H_{10}O_2$ MW, 150

Yellow prisms from pet. ether. M.p. 89–90°.

Et ether: $C_{11}H_{14}O_2$. MW, 178. B.p. 135°/10 mm. *Oxime*: m.p. 57°. *Phenylhydrazone*: m.p. 80°.

Phenyl ether: $C_{15}H_{14}O_2$. MW, 226. Needles. M.p. 73–5°. B.p. 210–15°/12 mm. *Oxime*: m.p. 96°.

Acetyl: needles. M.p. 84°.

Semicarbazone: needles from MeOH. M.p. 165°.

Auwers, *Ber.*, 1906, **39**, 3761.

Stoermer, Atenstädt, *Ber.*, 1902, **35**, 3564.

Blaise, Picard, *Compt. rend.*, 1911, **152**, 269.

N-Methylphenacylamine (ω -Methylamino-acetophenone)

$C_6H_5 \cdot CO \cdot CH_2 \cdot NH \cdot CH_3$ MW, 149

Yellow oil. Salts reduce Fehling's.

B.HCl: plates. M.p. 219° decomp. Spar. sol. hot EtOH.

B.HBr: plates. M.p. 203°. Sol. H_2O , EtOH.

Acetyl: needles from ligroin. M.p. 156°.

B.HAuCl₄: cryst. M.p. 134°.

B₂H₂PtCl₆: cryst. M.p. 206° decomp. Mod. sol. H_2O .

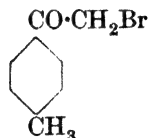
p-Toluenesulphonyl: needles + H_2O . M.p. 88°, anhyd. 133–4°.

Picrate: cryst. M.p. 145–6° (136°).

Almström, *Ann.*, 1915, 409, 300.

Gabriel, *Ber.*, 1914, 47, 1338.

p-Methylphenacyl bromide (*Bromomethyl p-tolyl ketone*)



C_9H_9OBr MW, 213

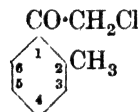
Plates from EtOH. M.p. 51°. Very sol. EtOH, Et_2O .

Verley, *Bull. soc. chim.*, 1897, 17, 909.

Methylphenacylcarbinol.

See γ -Hydroxybutyrophenone.

o-Methylphenacyl chloride (*Chloromethyl o-tolyl ketone*)



C_9H_9OCl MW, 168.5

B.p. 129–30°/11 mm. Strongly lachrymatory.

Semicarbazone: cryst. M.p. 103–5°.

Austin, Johnson, *J. Am. Chem. Soc.*, 1932, 54, 656.

p-Methylphenacyl chloride (*Chloromethyl p-tolyl ketone*).

Needles from EtOH. M.p. 57–8°. Very sol. EtOH, Et_2O .

Auwers, *Ber.*, 1906, 39, 3761.

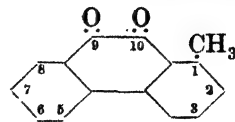
Methyl phenacyl Ether.

See under Phenacyl Alcohol.

Methyl phenacyl Ketone.

See Benzoylacetone.

1-Methylphenanthraquinone



$C_{15}H_{10}O_2$

MW, 222

Cryst. M.p. 191°.

Quinoxaline: m.p. 177°.

Haworth, *J. Chem. Soc.*, 1932, 1130.

2-Methylphenanthraquinone.

Orange plates from EtOH. M.p. 147–8°.

Quinoxaline: yellow needles from EtOH. M.p. 186–8°.

Haworth, *J. Chem. Soc.*, 1932, 1133.

3-Methylphenanthraquinone

Orange plates from EtOH. M.p. 205–6°.

Quinoxaline: yellow needles from AcOH. M.p. 207–8°.

See previous reference.

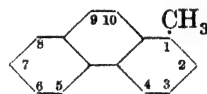
4-Methylphenanthraquinone.

Orange plates from EtOH. M.p. 187°.

Quinoxaline: pale yellow needles from EtOH. M.p. 178°.

Haworth, *J. Chem. Soc.*, 1932, 1131

1-Methylphenanthrene



$C_{15}H_{12}$

MW, 192

Plates from EtOH.Aq. M.p. 123°.

Picrate: yellow needles from EtOH. M.p. 139°.

Pschorr, *Ber.*, 1906, 39, 3111.

2-Methylphenanthrene.

Needles from EtOH.Aq. M.p. 55–6°. Alc. sol. shows blue fluor.

Picrate: yellow needles from EtOH. M.p. 118–19°.

Haworth, *J. Chem. Soc.*, 1932, 1133.

3-Methylphenanthrene.

Prisms or needles from EtOH. M.p. 62–3°.

Picrate: yellow needles from EtOH. M.p. 137–8°.

Haworth, *J. Chem. Soc.*, 1932, 1132.

4-Methylphenanthrene.

Plates from 95% EtOH. M.p. 49–50°. B.p. 175–85°/10 mm.

Picrate: cryst. from EtOH. M.p. 140–1°.

Styphnate: orange needles from EtOH. M.p. 135°.

Haworth, *J. Chem. Soc.*, 1932, 1131.

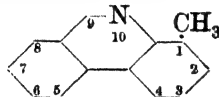
9-Methylphenanthrene.

Cryst. from EtOH.Aq. M.p. 90–1°.

Picrate: cryst. from EtOH. M.p. 152–3°.

Windaus, Jensen, Schramme, *Ber.*, 1924, 57, 1877.

1-Methylphenanthridine



$C_{14}H_{11}N$

MW, 193

Cryst. M.p. 70°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$, ligroin. Insol. H_2O . Aq. sols. of salts show blue fluor.

$B,HAuCl_4$: yellow needles from dil. HCl. M.p. 196–200°.

$B,HgCl_2$: yellow needles from HCl. M.p. 196°.

B_2,H_2PtCl_6 : pale yellow needles + $2H_2O$ from dil. HCl. Does not melt below 275°.

Methiodide: brownish-yellow needles from EtOH. M.p. 187° decomp. Sol. H_2O , EtOH. Spar. sol. Et_2O .

Pictet, Erlich, *Ann.*, 1891, 266, 160.

3-Methylphenanthridine.

Needles from EtOH.Aq. M.p. 131°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$, ligroin. Spar. sol. H_2O . Sols show blue fluor.

$B,HAuCl_4$: pale yellow needles from dil. HCl. M.p. 210° decomp. Insol. H_2O .

$B,HgCl_2$: golden-yellow needles from dil. HCl. M.p. 218°.

Picrate: yellow needles from EtOH. M.p. 202°.

Methiodide: brown needles from EtOH. M.p. 180° decomp.

See previous reference.

9-Methylphenanthridine.

Needles from ligroin. M.p. 85°. B.p. above 360°. Very sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Sol. hot ligroin. Spar. sol. boiling H_2O .

B,HCl : needles from H_2O . M.p. 285°. Spar. sol. H_2O , EtOH.

$B,HAuCl_4$: pale yellow needles from H_2O . M.p. 163–4° decomp.

$B,HgCl_2$: needles from H_2O or EtOH. M.p. 247°.

B_2,H_2PtCl_6 : needles + $2H_2O$ from dil. HCl. M.p. 272°.

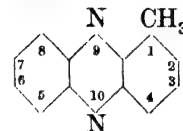
Picrate: yellow needles from H_2O . M.p. 233° decomp. Spar. sol. boiling H_2O .

Methiodide: yellow needles from H_2O or EtOH. M.p. 246–7° decomp.

Morgan, Walls, *J. Chem. Soc.*, 1931, 2450.

Pictet, Hubert, *Ber.*, 1896, 29, 1184.

1-Methylphenazine



$C_{13}H_{10}N_2$

MW, 194

Yellow needles. M.p. 108°.

Platinichloride: orange needles. Decomp. above 200°.

Clemo, McIlwain, *J. Chem. Soc.*, 1934, 1993.

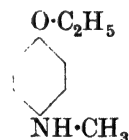
McCombie, Scarborough, Waters, *J. Chem. Soc.*, 1928, 356.

2-Methylphenazine.

Yellow needles from pet. ether. M.p. 117°.

Clemo, McIlwain, *J. Chem. Soc.*, 1935, 741.

N-Methyl-p-phenetidine (p-Methylamino-phenetole, p-ethoxy-methylaniline)



$C_9H_{13}ON$

MW, 151

B.p. 251°, 164°/40 mm., 102–4°/4 mm. Sol. EtOH, Et_2O . Spar. sol. H_2O .

N-Acetyl: N-methylphenacetin, N-methyl-p-acet-phenetidine. $C_{11}H_{15}O_2N$. MW, 193. Cryst. from EtOH or Et_2O . M.p. 41°. B.p. 295–305°.

N-Nitroso: plates from EtOH. M.p. 47–8°.

Picrate: cryst. M.p. 168°.

Wedekind, Fröhlich, *Ber.*, 1907, 40, 1003.

Brunner, Moser, *Monatsh.*, 1932, 61, 15.

Theimer, U.S.P., 1,497,253, (*Chem. Abstracts*, 1924, 18, 3254).

Methylphenol.

See Cresol.

Methylphenylacetic Acid.

See Hydratropic Acid and Tolylacetic Acid.

Methylphenylacetylene (Phenylallylene)

$C_6H_5:C:C-CH_3$

C_9H_8

MW, 116

B.p. 71–4°/15 mm. (70–80°/10 mm.). D_4^{18} 0.944. n_D^{18} 1.561.

Wohl, Jaschinowski, *Ber.*, 1921, **54**, 476.

Truchet, *Ann. chim.*, 1931, **16**, 309.

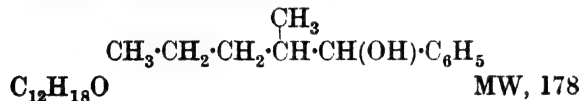
Methylphenylacrolein.

See Methylcinnamaldehyde.

N-Methylphenyl- α -alanine.

See α -Methylaminohydrocinnamic Acid.

2-Methyl-1-phenyl- n -amyl Alcohol (2-Methyl-1-phenylpentanol-1)

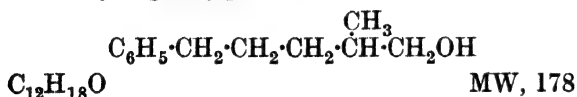


B.p. 126–7°/12 mm. Sol. most org. solvents. Insol. H_2O .

Acetyl: b.p. 136°/13 mm.

Dumesnil, *Ann. chim.*, 1917, **8**, 81.

2-Methyl-5-phenyl- n -amyl Alcohol (2-Methyl-5-phenylpentanol-1)



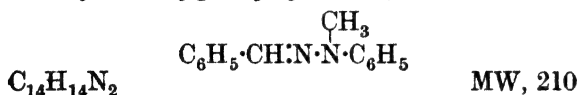
B.p. 159–60°/20 mm. D_4^{20} 0.9642.

v. Braun, Kirschbaum, *Ber.*, 1914, **47**, 266.

Methylphenylbenzylcarbinol.

See 2-Hydroxy-1:2-diphenylpropane.

Methylphenylbenzylidenedihydrazine (Benzaldehyde methylphenylhydrazine)



Yellow needles from EtOH. M.p. 104°.

Picrate: red needles. Unstable.

Ciusa, Vecchiotti, *Gazz. chim. ital.*, 1912, **42**, i, 563.

2-Methyl-2-phenylbutane.

See tert.-Amylbenzene.

2-Methyl-4-phenylbutane.

See Isoamylbenzene.

Methylphenylbutenone.

See Methyl methylstyryl Ketone.

3-Methyl-2-phenyl- n -butyl Alcohol.

See 2-Phenylisoamyl Alcohol.

2-Methyl-1-phenyl-sec.- n -butyl Alcohol.

See Methyl ethylbenzylcarbinol.

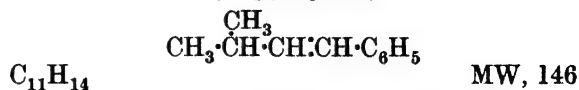
3-Methyl-2-phenyl-sec.- n -butyl Alcohol.

See Methylisopropylphenylcarbinol.

2-Methyl-1-phenyl-1-butylene.

See β -Methyl- β -ethylstyrene.

3-Methyl-1-phenyl-1-butylene (ω -Isobutylidenetoluene, β -isopropylstyrene)

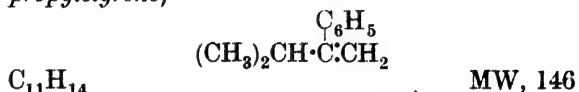


B.p. 201–3°. D_4^0 0.9194. n_D^{18} 1.532.

Nitrosite: cryst. M.p. 120°.

Levy, Dvoletzka-Gombinska, *Bull. soc. chim.*, 1931, **49**, 1770.

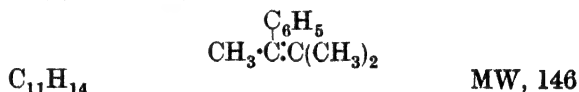
3-Methyl-2-phenyl-1-butylene (α -Isopropylstyrene)



B.p. 191–2°/753 mm., 82°/12 mm. D_4^{18} 0.8991. n_D^{18} 1.5181.

Klages, *Ber.*, 1903, **36**, 3691.

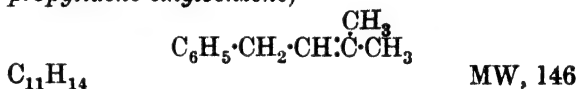
2-Methyl-3-phenyl-2-butylene (α -Isopropylidene-ethylbenzene)



B.p. 189°, 83°/12 mm.

Blaise, Courtot, *Bull. soc. chim.*, 1902, **35**, 587.

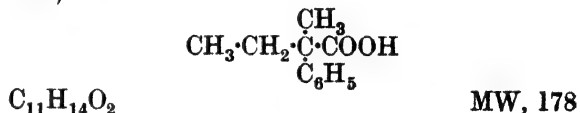
2-Methyl-4-phenyl-2-butylene (β -Isopropylidene-ethylbenzene)



B.p. 205°, 92°/15 mm. D_4^{18} 0.891. n_D^{18} 1.5125.

Klages, *Ber.*, 1904, **37**, 2315.

1-Methyl-1-phenylbutyric Acid (Methyl-ethylphenylacetic acid, 1-ethyl-1-phenylpropionic acid)



M.p. 60°. Very sol. most org. solvents.

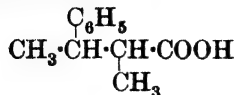
Me ester: $\text{C}_{12}\text{H}_{16}\text{O}_2$. MW, 192. B.p. 120°/16 mm.

Et ester: $\text{C}_{13}\text{H}_{18}\text{O}_2$. MW, 206. B.p. 124–5°/14 mm.

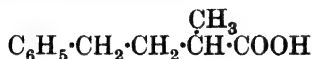
Amide: $\text{C}_{11}\text{H}_{15}\text{ON}$. MW, 177. Cryst. M.p. 119°.

Nitrile: $\text{C}_{11}\text{H}_{13}\text{N}$. MW, 159. B.p. 239°, 119–20°/15 mm.

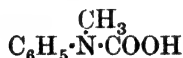
Blondeau, *Compt. rend.*, 1922, **174**, 1424.

1-Methyl-2-phenylbutyric Acid (1:2-Dimethyl-2-phenylpropionic acid)C₁₁H₁₄O₂ MW, 178

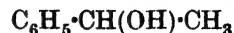
Prisms from pet. ether. M.p. 137–8°.

Rupe, Steiger, Fiedler, *Ber.*, 1914, 47, 72.**1-Methyl-3-phenylbutyric Acid**C₁₁H₁₄O₂ MW, 178

B.p. 180°/19 mm., 167°/11 mm.

Et ester: C₁₃H₁₈O₂. MW, 206. B.p. 143–4°/17 mm.*Chloride*: C₁₁H₁₃OCl. MW, 196.5. B.p. 125°/12 mm.Braun, Kirschbaum, *Ber.*, 1914, 47, 264.Schroeter, Lichtenstadt, Irinei, *Ber.*, 1918, 51, 1599.**4-Methyl-2-phenylbutyrolactone.**See under 4-Hydroxy-2-phenyl-*n*-caproic Acid.**N-Methylphenylcarbamic Acid** (*N*-Methyl-carbanilic acid)C₈H₉O₂N MW, 151*Me ester*: C₉H₁₁O₂N. MW, 165. Cryst. from EtOH. M.p. 44°. B.p. 235°, 117–19°/16 mm. D₄²⁰ 1.296. Sol. Et₂O, ligroin, hot conc. HCl.*Et ester*: methylphenylurethane. C₁₀H₁₃O₂N. MW, 179. B.p. 243–4°, 127–8°/18 mm. D₄^{17.8} 1.07585, D₄²⁰ 1.0741. n_D^{17.8} 1.51734, n_D²⁰ 1.51558.*Phenyl ester*: C₁₄H₁₃O₂N. MW, 227. Cryst. from EtOH. M.p. 58°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃.*p*-Tolyl ester: C₁₅H₁₅O₂N. MW, 241. Needles from EtOH. M.p. 62°.*o*-Nitrophenyl ester: C₁₄H₁₂O₄N₂. MW, 272. Yellow prisms from EtOH. M.p. 110°. Spar. sol. cold EtOH.*m*-Nitrophenyl ester: cryst. from EtOH. M.p. 105°.*p*-Nitrophenyl ester: greenish cryst. M.p. 69–70°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃.*Chloride*: C₈H₈ONCl. MW, 169.5. Plates from EtOH. M.p. 88–9°. B.p. 280°. Sol. EtOH, Et₂O. Insol. H₂O.Slosson, *Am. Chem. J.*, 1903, 29, 300.Schmidt, *Ber.*, 1903, 36, 2477; *Z. physik.**Chem.*, 1907, 58, 518.Lellmann, *Benz. Ber.*, 1891, 24, 2108.

Dict. of Org. Comp.—II.

Methylphenylcarbinol (1-Phenylethyl alcohol, α-methylbenzyl alcohol, α-hydroxyethylbenzene)C₈H₁₀O MW, 122*d*-. B.p. 98–9°/20 mm. [α]_D¹⁹₄₆₁ + 13.02°.*Acetyl*: b.p. 120°/35 mm. [M]_D²⁴ + 43.95°.*Acid phthalate*: m.p. 81–2°. [α]_D¹⁹₄₆₁ – 40.7° in EtOH.*l*-. B.p. 93°/14 mm. [α]_D¹⁸₄₆₁ – 13.27°.*Et ether*: C₁₀H₁₄O. MW, 150. Oil. B.p. 71.5°/15 mm. D₄²⁰ 0.928.*Acid phthalate*: m.p. 81–2°. [α]_D²⁰₄₆₁ + 39.8° in EtOH.*dl*-. B.p. 100°/18 mm., 90°/15 mm. D₄¹⁵ 1.008.n_D¹⁵ 1.526.*Acetyl*: b.p. 222°, 105–8°/15 mm.*Et ether*: b.p. 185–7°, 67–9°/11 mm.Marshall, *J. Chem. Soc.*, 1915, 107, 523.Houssa, Kenyon, *J. Chem. Soc.*, 1930, 2261.Holmberg, *Ber.*, 1912, 45, 1002.**Methyl-2-phenylcinchoninic Acid.**

See Methyl-2-phenylquinoline-4-carboxylic Acid.

Methyl phenyl Diketone.

See Acetylbenzoyl.

N-Methyl-o-phenylenediamine (*o*-Amino-methylaniline)C₇H₁₀N₂ MW, 122

Oil. B.p. 245–8°/736 mm. Darkens rapidly.

B,2HCl: cryst. from EtOH. M.p. 191°.*l*-Acetyl: *o*-amino-*N*-methylacetanilide. Needles from 30% EtOH. M.p. 67–8°.*l*:2-*N*-Diacetyl: plates from H₂O. M.p. 172°.Fischer, *Ber.*, 1892, 25, 2841.Phillips, *J. Chem. Soc.*, 1929, 2824.**N-Methyl-m-phenylenediamine** (*m*-Aminomethylaniline).

B.p. 265–70°, 160–3°/10 mm.

Fischer, *Ann.*, 1895, 286, 173.**N-Methyl-p-phenylenediamine** (*p*-Aminomethylaniline).Leaflets. M.p. 35.5°. B.p. 257–259.5°, 152°/20 mm. Sol. H₂O, EtOH, Et₂O.

1-*Formyl*: *p*-amino-*N*-methylformanilide. Needles from pet. ether. M.p. 132°. Darkens in light and air.

1-*Acetyl*: *p*-amino-*N*-methylacetanilide. Needles from pet. ether. M.p. 63°. Turns yellow in air.

Willstätter, Pfannenstiel, *Ber.*, 1905, **38**, 2249.

Morgan, Grist, *J. Chem. Soc.*, 1918, **113**, 688.

Thiele, Wheeler, *Ber.*, 1895, **28**, 1539.

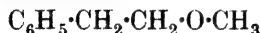
Methyl phenyl Ether.

See Anisole.

Methyl-phenylethyl-carbinol.

See 4-Phenyl-*sec*.-*n*-butyl Alcohol.

Methyl phenylethyl Ether



$\text{C}_9\text{H}_{12}\text{O}$ MW, 136

B.p. 190–5° (189–90°).

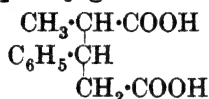
Müller, *Chimie et Industrie*, 1932, **27**, 881.

Hamonet, *Compt. rend.*, 1903, **138**, 814.

Methyl phenylethyl Ketone.

See Benzylacetone.

1-Methyl-2-phenylglutaric Acid



$\text{C}_{12}\text{H}_{14}\text{O}_4$ MW, 222

Prisms from H_2O or ligroin. M.p. 125°. Sol. EtOH , Et_2O , CHCl_3 , hot C_6H_6 . Insol. pet. ether.

Imide: $\text{C}_{12}\text{H}_{13}\text{O}_2\text{N}$. MW, 203. Prisms from H_2O . M.p. 144°.

Anhydride: $\text{C}_{12}\text{H}_{12}\text{O}_3$. MW, 204. M.p. 74°.

Carter, Lawrence, *Proc. Chem. Soc.*, 1900, **16**, 178.

Avery, Fossler, *Am. Chem. J.*, 1898, **20**, 516.

Methylphenylglyoxal.

See Acetylbenzoyl.

1-Methyl-2-phenylglyoxaline (1-Methyl-2-phenyliminazole)



$\text{C}_{10}\text{H}_{10}\text{N}_2$ MW, 158

Oil. B.p. 175°/15 mm. Sol. most org. solvents. Insol. H_2O .

B.HCl: needles. Very sol. H_2O , EtOH .

B.HNO: needles. M.p. 100°.

Picrate: plates from H_2O . M.p. 133°.

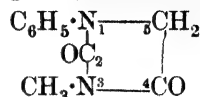
Methochloride: needles from $\text{EtOH}-\text{Et}_2\text{O}$. M.p. 272°. Very hygroscopic. *Chloroaurate*: leaflets from dil. HCl . M.p. 134°.

Balaban, King, *J. Chem. Soc.*, 1925, **127**, 2714.

Methylphenylglyoxime.

See under Acetylbenzoyl.

3-Methyl-1-phenylhydantoin



$\text{C}_{10}\text{H}_{10}\text{O}_2\text{N}_2$ MW, 190

Cryst. from EtOH.Aq . M.p. 185°.

Acetyl deriv.: cryst. M.p. 145–6°.

Biltz, Slötta, *J. prakt. Chem.*, 1926 **113**, 265.

5-Methyl-3-phenylhydantoin.

d-. Needles from dil. HCl . M.p. 178°. $[\alpha]_D^{20}$ –10.04° in Me_2CO .

dl-. Needles from EtOH.Aq . M.p. 172–3°.

West, *J. Biol. Chem.*, 1918, **34**, 190.

Mouneyrat, *Ber.*, 1900, **33**, 2394.

5-Methyl-5-phenylhydantoin.

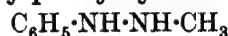
Cryst. M.p. 197°.

Abe, *Chem. Abstracts*, 1934, **28**, 4383.

1-Methyl-2-phenylhydracrylic Acid.

See 2-Hydroxy-2-phenylisobutyric Acid.

sym.-Methylphenylhydrazine



$\text{C}_7\text{H}_{10}\text{N}_2$ MW, 122

Oil. B.p. 200–1°/331 mm., 110–12°/12–15 mm. D_{15}^{20} 1.04. n_D^{20} 1.5755. Reduces Fehling's and $\text{NH}_3 \cdot \text{AgNO}_3$.

B.HCl: plates from $\text{EtOH}-\text{Et}_2\text{O}$. M.p. 160–1°.

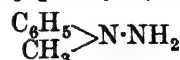
B_2H_2SO: plates from EtOH . M.p. 182°.

Methochloride: cryst. M.p. 187–8° decomp.

Methiodide: cryst. M.p. 126°.

Knorr, Wendel, *Ber.*, 1909, **42**, 3523.

unsym.-Methylphenylhydrazine

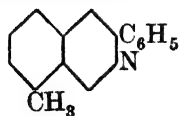


$\text{C}_7\text{H}_{10}\text{N}_2$ MW, 122

B.p. 131°/35 mm., 106–9°/13 mm. $n_D^{21.6}$ 1.58235. Misc. with EtOH , Et_2O , CHCl_3 , C_6H_6 in all proportions. Spar. sol. H_2O : Reduces Fehling's.

Hartmann, Roll, *Organic Syntheses*, 1933, **XIII**, 66.

8-Methyl-3-phenylisoquinoline

 $C_{18}H_{13}N$

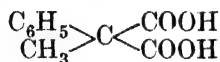
MW, 219

Cryst. M.p. 51°.

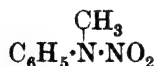
Hydrochloride: needles. M.p. about 236–40°.Spar. sol. cold H_2O .*Hydriodide*: yellow needles. Decomp. about 270°. Spar. sol. cold H_2O .*Chromate*: cryst. M.p. 164°. $B, HAuCl_4, H_2O$: needles. M.p. 211° decomp.*Chloroplatinate*: yellow needles. M.p. 221° decomp.*Picrate*: cryst. M.p. 232°.Müller, *Ber.*, 1909, 42, 430.

Methyl phenyl Ketone.

See Acetophenone.

Methylphenylmalonic Acid (1-Phenylisobutyric acid ethylbenzene- $\alpha\alpha$ -dicarboxylic acid) $C_{10}H_{10}O_4$

MW, 194

Cryst. M.p. 157° decomp. \rightarrow hydratropic acid.*Di-Et ester*: $C_{14}H_{18}O_4$. MW, 250. B.p. 165–6°/16 mm.*Dichloride*: $C_{10}H_8O_2Cl_2$. MW, 231. Oil. B.p. 114–15°/12 mm. part decomp.*Dinitrile*: $C_{10}H_8N_2$. MW, 156. B.p. 125–30°/16 mm.Staudinger, Ruzicka, *Ann.*, 1911, 380, 288.Hessler, *J. Am. Chem. Soc.*, 1917, 39, 73.**Methylphenylnitramine** (N-Nitro-N-methylaniline) $C_7H_8O_2N_2$

MW, 152

Needles or plates from Et_2O . M.p. 38.5–39.5°. Sol. usual org. solvents. Volatile in steam.Bamberger, *Ber.*, 1894, 27, 366.

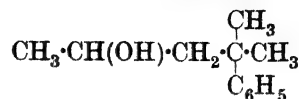
Methylphenylnitrosamine.

See under Methylaniline.

Methylphenyloxamic Acid.

See N-Methyloxanilic Acid.

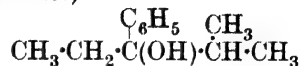
2-Methyl-2-phenylpentanol-4

 $C_{12}H_{18}O$

MW, 178

B.p. 132°/17 mm. D_{25}^{25} 0.960.Hoffman, *J. Am. Chem. Soc.*, 1929, 51, 2545.

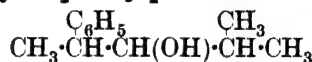
2-Methyl-3-phenylpentanol-3 (Ethylisopropylphenylcarbinol)

 $C_{12}H_{18}O$

MW, 178

B.p. 224–6° decomp., 114–16°/18 mm. (120–2°/18 mm.). D_{15}^{15} 0.9689. n_D^{15} 1.5155. Does not form a phenylurethane.Apolit, *Ann. chim.*, 1924, 2, 89.Klages, Haehn, *Ber.*, 1904, 37, 1724.

2-Methyl-4-phenylpentanol-3

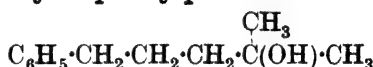
 $C_{12}H_{18}O$

MW, 178

B.p. 156–60°/30 mm.

Lévy, Jullien, *Bull. soc. chim.*, 1929, 45, 945.

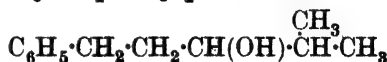
2-Methyl-5-phenylpentanol-2

 $C_{12}H_{18}O$

MW, 178

B.p. 130°/10 mm., 120°/7 mm. D_4^{25} 0.9556. n_D^{25} 1.50681.*Phenylurethane*: m.p. 101.5–102.5°.Bogert, Davidson, Apfelbaum, *J. Am. Chem. Soc.*, 1934, 56, 961.

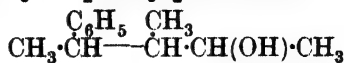
2-Methyl-5-phenylpentanol-3

 $C_{12}H_{18}O$

MW, 178

B.p. 138–42°/13 mm., 130.5–131.5°/10 mm. D_4^{25} 0.9563. n_D^{25} 1.50466.Bogert, Davidson, Apfelbaum, *J. Am. Chem. Soc.*, 1934, 56, 962.

3-Methyl-4-phenylpentanol-2

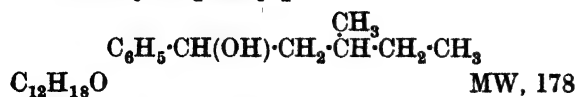
 $C_{12}H_{18}O$

MW, 178

B.p. 129–31°/11 mm.

Ruzicka, Ehmann, *Helv. Chim. Acta*, 1932, 15, 145.

3-Methyl-5-phenylpentanol-5



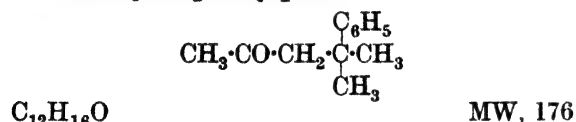
B.p. 163°/50 mm. D_4^{25} 0.9523. n_D^{25} 1.5059.

Davies, Dixon, Jones, *J. Chem. Soc.*, 1930, 472.

Methylphenylpentanol.

See also Isoamylphenylcarbinol, 2-Methyl-1-phenyl-*n*-amyl Alcohol, 2-Methyl-5-phenyl-*n*-amyl Alcohol, Methyl-*sec*-.*n*-butylphenylcarbinol, and 1-Phenylisohexyl Alcohol.

2-Methyl-2-phenylpentanone-4



Liq. with odour resembling camphor. B.p. 252°, 134°/22 mm., 120–30°/11 mm. D_4^{25} 0.972.

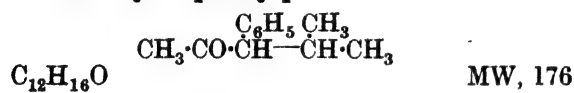
Oxime: m.p. 52–4°. B.p. 181°/27 mm.

Semicarbazone: cryst. from MeOH. M.p. 164°.

Hoffman, *J. Am. Chem. Soc.*, 1929, 51, 2543.

Ziegler, Dersch, Wollthan, *Ann.*, 1934, 511, 35.

2-Methyl-3-phenylpentanone-4

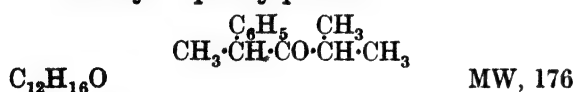


B.p. 115–18°/28 mm.

Semicarbazone: m.p. 153–4°.

Lévy, Jullien, *Bull. soc. chim.*, 1929, 45, 948.

2-Methyl-4-phenylpentanone-3

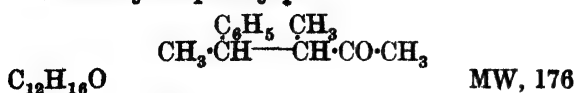


B.p. 256–7°.

Semicarbazone: m.p. 129–30°.

Lévy, Jullien, *Bull. soc. chim.*, 1929, 45, 945.

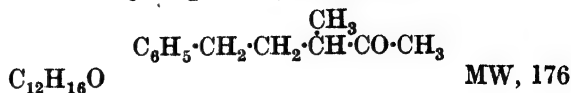
3-Methyl-4-phenylpentanone-2



B.p. 115–17°/11 mm.

Ruzicka, Ehmman, *Helv. Chim. Acta*, 1932, 15, 144.

3-Methyl-5-phenylpentanone-2



B.p. 127–8°/8 mm.

Oxime: needles from C_6H_6 . M.p. 95–6°.

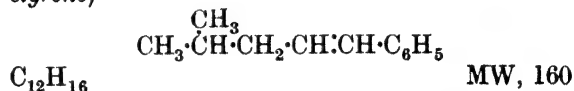
B.p. 154–8°/7 mm.

Semicarbazone: cryst. from EtOH. M.p. 180° (sinters at 162°).

Rupe, Hirschmann, *Helv. Chim. Acta*, 1931, 14, 697.

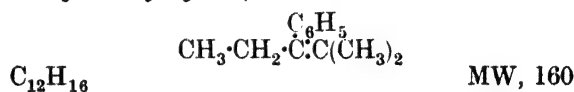
Methylphenylpentanone.

See also Isobutyl benzyl Ketone and Isopropyl phenylethyl Ketone.

4-Methyl-1-phenyl-1-pentene (β -Isobutylstyrene)

Liq. with pleasant odour. B.p. 107–9°/11 mm.

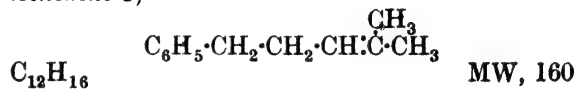
Reich, Wijck, Waelle, *Helv. Chim. Acta*, 1921, 4, 244.

2-Methyl-3-phenyl-2-pentene ($\beta\beta$ -Dimethyl- α -ethylstyrene)

B.p. 202–5°.

Apolit, *Ann. chim.*, 1924, 2, 102.

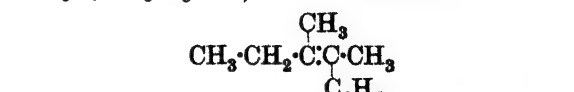
2-Methyl-5-phenyl-2-pentene (1-Phenylisohexene-3)



B.p. 108–112°/25 mm.

Bogert, Davidson, Apfelbaum, *J. Am. Chem. Soc.*, 1934, 56, 961.

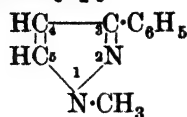
I.G., D.R.P., 557,514, (*Chem. Abstracts*, 1933, 27, 514).

3-Methyl-2-phenyl-2-pentene ($\alpha\beta$ -Dimethyl- β -ethylstyrene)

B.p. 204–6°.

Apolit, *Ann. chim.*, 1924, 2, 103.

1-Methyl-3-phenylpyrazole

 $C_{10}H_{10}N_2$

MW, 156

M.p. 56°. B.p. 280–1°, 138–9°/12 mm. D_4^{20} 1.0232. n_D^{20} 1.56216.

Picrate: yellow leaflets. M.p. 132°.

Methiodide: m.p. 156–7°.

Auwers, Mausolf, *Ber.*, 1927, 60, 1730.

1-Methyl-5-phenylpyrazole.

B.p. 118°/12 mm. D_4^{20} 1.090. n_D^{20} 1.5881.

Picrate: greenish-yellow needles from EtOH. M.p. 143°.

See previous reference.

3-Methyl-1-phenylpyrazole.

Needles. M.p. 37°. B.p. 255°. D_4^{20} 1.076. n_D^{20} 1.591. Sol. EtOH, ligroin. Weak base. Volatile in steam.

$B_2H_2PtCl_6$: m.p. anhyd. 173°.

Methiodide: cryst. from EtOH. M.p. 144°. Sol. EtOH. Spar. sol. Et₂O.

Stoermer, *Ber.*, 1903, 36, 3988.

Knorr, *Ann.*, 1894, 279, 220 (Footnote, *Bibl.*).

Claisen, Roosen, *Ann.*, 1894, 278, 274.

4-Methyl-1-phenylpyrazole.

Yellowish oil with aromatic odour. B.p. 264–6°. Insol. H₂O.

$B_2H_2PtCl_6 \cdot 2H_2O$: reddish-yellow needles. M.p. 159–60° decomp.

Methiodide: needles from H₂O. M.p. 160°.

Balbiano, Marchetti, *Gazz. chim. ital.*, 1893, 23, i, 487.

5-Methyl-1-phenylpyrazole.

Oil with odour resembling quinoline. B.p. 263.5°/762 mm., 254–5°/720 mm., 144–5°/19 mm. D_4^{20} 1.086. n_D^{20} 1.582. Volatile in steam.

$B_2H_2PtCl_6$: plates from EtOH–conc. HCl. M.p. 198–9° (171° decomp.).

Picrate: cryst. from EtOH. M.p. 97–8°.

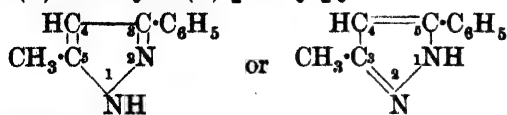
Methiodide: plates from EtOH. M.p. 296° (287°, 256–7°).

Ethiodide: needles. M.p. 208°.

Stoermer, *Ber.*, 1907, 40, 484.

Claisen, *Ann.*, 1897, 295, 315.

5(3)-Methyl-3(5)-phenylpyrazole

 $C_{10}H_{10}N_2$

MW, 158

Prisms from pet. ether. M.p. 128°. B.p. 326–7°, 191–3°/14 mm. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. ligroin. Spar. volatile in steam.

$B \cdot HCl$: m.p. 205°.

Picrate: prisms from MeOH. M.p. 159°.

Derivs. of 3-Methyl-5-phenylpyrazole:—

1-Acetyl: plates from EtOH.Aq. M.p. 45.5–46.5°.

1-Propionyl: prisms from EtOH.Aq. M.p. 33–4°.

1-Butyryl: needles from pet. ether. M.p. 34–34.5°.

1-Benzoyl: cryst. from pet. ether. M.p. 88–9°.

1-o-Nitrobenzoyl: m.p. 157–157.5°.

1-o-Toluyyl: prisms. M.p. 63–5°.

1-m-Toluyyl: needles. M.p. 79–80°.

1-p-Toluyyl: decomp. at 83–5°. Very indefinite m.p.

Derivs. of 5-Methyl-3-phenylpyrazole:—

1-Acetyl: m.p. 41°. B.p. 158–60°/11 mm.

1-Propionyl: needles from EtOH. M.p. 77–78.5°.

1-Butyryl: needles from EtOH. M.p. 72–72.5°. B.p. 150–2°/10 mm.

1-Benzoyl: prisms from EtOH. M.p. 83–4°.

1-o-Nitrobenzoyl: m.p. 107–8°.

1-o-Toluyyl: needles from pet. ether. M.p. 36.5–37.5°.

1-m-Toluyyl: needles from MeOH. M.p. 56–7°.

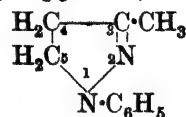
1-p-Toluyyl: needles from MeOH. M.p. 68–70°.

Auwers, Stuhlmann, *Ber.*, 1926, 59, 1048.

Auwers, Dietrich, *J. prakt. Chem.*, 1934, 139, 65.

For non-equivalence of positions 3 and 5 see Auwers, *Ann.*, 1934, 508, 51.

3-Methyl-1-phenylpyrazoline (3-Methyl-1-phenyl-4:5-dihydropyrazole)

 $C_{10}H_{12}N_2$

MW, 160

Needles from Et₂O or ligroin. M.p. 76–7°. B.p. 289°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. ligroin. Mod. volatile in steam.

Ach, *Ann.*, 1889, 253, 56.

Maire, *Bull. soc. chim.*, 1908, 3, 272.

5-Methyl-1-phenylpyrazoline.

B.p. 130–2°/18 mm. Sol. EtOH, Et₂O, CHCl₃. C₆H₆. Insol. HO.

Benzylidene deriv.: prisms. M.p. 140°.

Di-ethiodide: decomp. at 230°. Insol. CHCl_3 .

Trener, *Monatsh.*, 1900, 21, 1111.

1-Methyl-3-phenylpyrazoline.

Leaflets from pet. ether. M.p. 37°.

Hydrochloride: m.p. 162°. Sol. H_2O , EtOH. Spar. sol. Me_2CO .

Mannich, Heilner, *Ber.*, 1922, 55, 368.

5-Methyl-3-phenylpyrazoline.

B.p. 158-9°/13 mm.

Carbanilide: m.p. 126°.

1-Acetyl: cryst. from pet. ether. M.p. 62-3°. B.p. 181°/11 mm. *B.HCl*: m.p. 89-91°.

1-Nitroso: plates from MeOH. M.p. 93.5-94°.

Freudenberg, Stoll, *Ann.*, 1924, 440, 43.

Auwers, Heimke, *Ann.*, 1927, 458, 212.

1-Methyl-5-phenylpyrazoline.

Yellowish oil. B.p. 137-8°/30 mm.

Picrate: yellow needles from EtOH. M.p. 125°. Spar. sol. H_2O .

Auwers, Heimke, *Ann.*, 1927, 458, 211.

3-Methyl-5-phenylpyrazoline.

Thick liq. B.p. 180°/32 mm., 159°/16 mm. D_4^{20} 1.0669. n_D^{20} 1.5956. Turns yellow in air.

N-Acetyl: cryst. from ligroin. M.p. 76°. B.p. 184°/13 mm.

N-Benzoyl: cryst. from MeOH. M.p. 137-8°.

N-Benzyl: b.p. 202-3°/11 mm.

N-Nitroso: yellowish needles from MeOH. M.p. 96.5-97.5°.

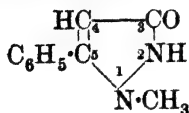
Phenylcarbamide: cryst. from MeOH. M.p. 135°.

Picrate: yellow needles from EtOH. M.p. 142-3°.

Freudenberg, Stoll, *Ann.*, 1924, 440, 43.

Auwers, Heimke, *Ann.*, 1927, 458, 214.

1-Methyl-5-phenylpyrazolone-3



$\text{C}_{10}\text{H}_{10}\text{ON}_2$ MW, 174

Cryst. from H_2O . M.p. 161°. Addn. of NaNO_2 to HCl sol. \rightarrow greenish-yellow col.

Auwers, Mauss, *J. prakt. Chem.*, 1925, 110, 206, 219.

4-Methyl-1-phenylpyrazolone-3.

Needles from EtOH. M.p. 210°. Sol. warm

alkalis. Oxidation does not give a Pyrazole Blue reaction.

Fichter, Enzenauer, Vollenberg, *Ber.*, 1900, 33, 494.

Stolz, *Ber.*, 1905, 38, 3273.

5-Methyl-1-phenylpyrazolone-3.

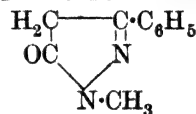
Cryst. from EtOH. M.p. 167°. Also exists in a labile form, m.p. 157°. Sol. EtOH, CHCl_3 , C_6H_6 , dil. NaOH, min. acids.

Picrate: cryst. from EtOH. M.p. 141°.

Brunner, Moser, *Monatsh.*, 1929, 53 and 54, 682.

Mayer, *Ber.*, 1903, 36, 717.

1-Methyl-3-phenylpyrazolone-5



$\text{C}_{10}\text{H}_{10}\text{ON}_2$ MW, 174

Needles from EtOH. M.p. 207°. B.p. 330-40° part. decomp., 235°/68 mm. Sol. hot EtOH, hot AcOH. Very spar. sol. H_2O , Et_2O , ligroin. $\text{FeCl}_3 \rightarrow$ reddish-brown col. in EtOH.Aq.

B.HCl.H2O: needles. M.p. 179°.

B2.H2SO4.2H2O: m.p. 77°, anhyd. 160°.

B.HNO3.H2O: leaflets. M.p. 118°.

4-Isonitroso deriv.: orange leaflets. M.p. 162°.

Michaelis, Dorn, *Ann.*, 1907, 352, 163.

Auwers, Mauss, *J. prakt. Chem.*, 1925, 110, 219.

2-Methyl-1-phenylpyrazolone-5

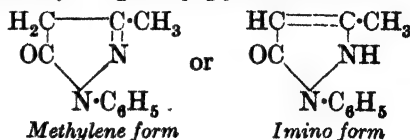


$\text{C}_{10}\text{H}_{10}\text{ON}_2$ MW, 174

M.p. 117°. FeCl_3 .Aq. \rightarrow red col.

Stolz, *Ber.*, 1895, 28, 631.

3-Methyl-1-phenylpyrazolone-5



$\text{C}_{10}\text{H}_{10}\text{ON}_2$ MW, 174

Prisms from H_2O . M.p. 127°. B.p. 287°/205 mm. Sol. hot EtOH. Insol. Et_2O , ligroin, cold H_2O . $\text{FeCl}_3 \rightarrow$ Pyrazole Blue. Very spar. volatile in steam. Forms metallic salts

with Cu, Co, Ag, etc. Couples with diazo salts, the $\text{CH}_2\text{-CO-}$ enolising. Intermediate for azo dyestuffs.

$B, \text{HCl}, \text{H}_2\text{O}$: prisms. M.p. 96°.

$B_2, \text{H}_2\text{PtCl}_6, 4\text{H}_2\text{O}$: yellowish-red prisms. M.p. about 110°.

Ethylenediamine salt: $\text{C}_2\text{H}_8\text{N}_2, 2\text{C}_{10}\text{H}_{10}\text{ON}_2$. Needles. M.p. 204°. Spar. sol. EtOH.

4-Isonitroso deriv.: orange needles from AcOH. M.p. 157° (151–2°).

$\text{C}_{10}\text{H}_{10}\text{ON}_2, \text{C}_6\text{H}_5(\text{NO}_2)_3 \cdot 1:3:5$: red prisms from EtOH. M.p. 92°.

N-Me: see Antipyrine.

Mitra, *J. Indian Chem. Soc.*, 1931, **8**, 474.

Bucherer, Grolée, *Ber.*, 1906, **39**, 1006.

Feist, *Ann.*, 1906, **345**, 113.

Stolz, *J. prakt. Chem.*, 1897, **55**, 164, 166.

Knorr, *Ann.*, 1887, **238**, 147.

I.G., E.P., 274,366, (*Chem. Abstracts*, 1928, **22**, 1983).

4-Methyl-1-phenylpyrazolone-5.

Needles from EtOH. M.p. 148°.

Fichter, Enzenauer, Vollenberg, *Ber.*, 1900, **33**, 498.

Stolz, *Ber.*, 1905, **38**, 3273.

4-Methyl-3-phenylpyrazolone-5.

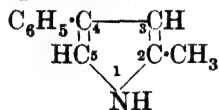
Cryst. from H_2O . M.p. 213–214.5°. Sol. EtOH, Et_2O , CHCl_3 , xylene. Spar. sol. C_6H_6 . Sol. alkalis, alkali carbonates, dil. HCl.

Auwers, Mauss, *J. prakt. Chem.*, 1925, **110**, 206, 221.

Methylphenylpyridine.

See Phenylpicoline.

2-Methyl-4-phenylpyrrole



$\text{C}_{11}\text{H}_{11}\text{N}$ MW, 157

Yellowish-green viscous liq. B.p. 175°/25 mm. Darkens on keeping in sealed tube.

Ehrenstein, *Ber.*, 1931, **64**, 1140.

2-Methyl-5-phenylpyrrole.

Leaves. M.p. 103°. Sublimes with part. decomp. Sol. EtOH, Et_2O , C_6H_6 , AcOH. Sol. unchanged in hot fuming HCl and cold conc. H_2SO_4 .

N-Phenyl: plates from C_6H_6 or ligroin. M.p. 84°. Spar. volatile in steam.

N-o-Tolyl: plates. M.p. 44°. B.p. 325–8°. Sol. EtOH, Et_2O , C_6H_6 , ligroin.

N-p-Tolyl: plates from ligroin. M.p. 91°. B.p. above 350°. Sol. C_6H_6 , ligroin.

N-1-Naphthyl: leaflets. M.p. 74°. B.p. above 360°. Sol. EtOH, C_6H_6 , ligroin.

N-2-Naphthyl: needles from ligroin. M.p. 52°. Sol. EtOH, C_6H_6 , ligroin.

Lederer, Paal, *Ber.*, 1885, **18**, 2596.

Borsche, Fels, *Ber.*, 1906, **39**, 3884.

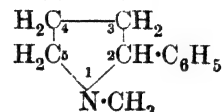
Paal, *Ber.*, 1885, **18**, 370.

3-Methyl-5-phenylpyrrole.

Cryst. from 25% EtOH. M.p. 152°. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Piloty, Hirsch, *Ann.*, 1913, **395**, 66.

1-Methyl-2-phenylpyrrolidine (1-Methyl-2-phenyltetrahydropyrrole)



$\text{C}_{11}\text{H}_{15}\text{N}$ MW, 161

Oil with pleasant odour. B.p. 217.5°, 106°/20 mm. Sol. most org. solvents. Sol. 500 parts H_2O .

$B_2, \text{H}_2\text{PtCl}_6$: cryst. from H_2O . M.p. 122°.

Picrate: cryst. from 95% EtOH. M.p. 146°.

Craig, *J. Am. Chem. Soc.*, 1933, **55**, 2544.

2-Methyl-1-phenylpyrrolidine (2-Methyl-1-phenyltetrahydropyrrole).

B.p. 136–8°/16 mm., 127.5°/13 mm. D_4^{20} 1.011. Turns red in air. Readily sol. most org. solvents. Insol. H_2O .

$B_2, \text{H}_2\text{PtCl}_6$: orange leaflets. M.p. 135°. Decomp. by hot H_2O .

$B_2, 2\text{HCl}, \text{SnCl}_2$: needles from H_2O . M.p. 107–9°.

Picrate: needles from H_2O . M.p. 110° (105°). *Methiodide*: m.p. 159° decomp.

Wolff, *Ber.*, 1925, **58**, 405.

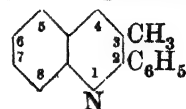
2-Methyl-4-phenylpyrrolidine (2-Methyl-4-phenyltetrahydropyrrole).

Very hygroscopic oil. B.p. 112°/10 mm. Turns yellow in air.

N-Benzoyl: prisms from Et_2O -pet. ether. M.p. 82–3°. Sol. EtOH, Et_2O . Spar. sol. ligroin.

Kohler, Drake, *J. Am. Chem. Soc.*, 1923, **45**, 2147.

3-Methyl-2-phenylquinoline



$\text{C}_{18}\text{H}_{13}\text{N}$

MW, 219

4-Methyl-2-phenylquinoline

Prisms from pet. ether. M.p. 52-3° (43°). B.p. above 300°. Very sol. EtOH, Et₂O, C₆H₆, ligroin. Insol. H₂O.

Picrate: yellow leaflets from EtOH. M.p. 205°. Very spar. sol. cold EtOH.

Methiodide: yellow needles. M.p. 235°.

v. Miller, Kinkelin, *Ber.*, 1886, **19**, 527.

v. Braun, Brauns, *Ber.*, 1927, **60**, 1256.

4-Methyl-2-phenylquinoline.

See Flavoline.

6-Methyl-2-phenylquinoline.

Yellowish needles from EtOH.Aq. M.p. 69°. B.p. 270°/12 mm.

Hydrochloride: m.p. 209°.

Picrate: m.p. 208°.

Döbner, Gieseke, *Ann.*, 1887, **242**, 298.

v. Braun, Brauns, *Ber.*, 1927, **60**, 1255.

7-Methyl-2-phenylquinoline.

M.p. 100-5°.

Picrate: m.p. 192°.

Pt salt: decomp. at 243-4°.

Kaku, *Journal of the Pharmaceutical Society, Japan*, 1927, No. **545**, 90.

8-Methyl-2-phenylquinoline.

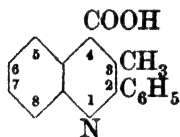
Leaflets from EtOH. M.p. 49-50°.

Döbner, Gieseke, *Ann.*, 1887, **242**, 299.

2-Methyl-phenylquinoline.

See Phenylquinaldine.

3-Methyl-2-phenylquinoline-4-carboxylic Acid (3-Methylcinchophene, 3-methylatophan, 3-methyl-2-phenylcinchoninic acid)



C₁₇H₁₃O₂N

MW, 263

Powder. M.p. 299°. Spar. sol. H₂O, EtOH. Decomp. above m.p.

Me ester: C₁₈H₁₅O₂N. MW, 277. Prisms from Et₂O. M.p. 70-1°. Sol. usual org. solvents.

Et ester: C₁₉H₁₇O₂N. MW, 291. Needles from 70% EtOH. M.p. 51°. Sol. usual org. solvents.

Propyl ester: C₂₀H₁₉O₂N. MW, 305. Oil. *Picrate*: cryst. from MeOH. M.p. 163°. Spar. sol. EtOH.

2-Chloroethyl ester: C₁₉H₁₆O₂NCl. MW, 325.5. Prisms from Et₂O. M.p. 81°. Sol. usual org. solvents.

792

6-Methyl-2-phenylquinoline-4-carboxylic Acid

Amide: C₁₇H₁₄ON₂. MW, 262. Needles from xylene. M.p. 286°. Sol. MeOH, EtOH, propyl alcohol, isopropyl alcohol, amyl alcohol, Et₂O. Less sol. hot C₆H₆, toluene, xylene, chlorobenzene.

Diethylamide: C₂₁H₂₂ON₂. MW, 318. Prisms from chlorobenzene. M.p. 127°. Sol. EtOH, MeOH. Less sol. propyl alcohol, isopropyl alcohol, amyl alcohol, C₆H₆, toluene, xylene, chlorobenzene. Insol. H₂O, Et₂O, pet. ether.

Hydrazide: cryst. from 70% EtOH. M.p. 141°. Sol. MeOH, EtOH, propyl alcohol, isopropyl alcohol, amyl alcohol, CHCl₃. Less sol. C₆H₆, toluene, xylene, chlorobenzene. *Picrate*: prisms from EtOH. M.p. 215°.

Isopropylidene-hydrazide: needles from C₆H₆. M.p. 151°. Sol. MeOH. Less sol. EtOH. Spar. sol. Et₂O, C₆H₆, toluene, xylene, pet. ether.

John, Ottawa, *J. prakt. Chem.*, 1931, **131**, 301.

6-Methyl-2-phenylquinoline-4-carboxylic Acid (6-Methylcinchophene, 6-methylatophan, paratophan, 6-methyl-2-phenylcinchoninic acid).

Yellow needles from EtOH. M.p. 228°. Sol. EtOH, Et₂O. Insol. H₂O.

B,HCl: m.p. 254-5°.

B,HBr: m.p. 289°.

B,HI: orange-yellow cryst. M.p. 268-5°.

Me ester: cryst. from Et₂O. M.p. 85°.

Et ester: novatophan, neocinchophene, tolysin. Yellow cryst. powder. M.p. 75-6°. Sol. usual org. solvents. Insol. H₂O. Used in treatment of rheumatism. *B,HF*: m.p. 170-2°. *B,HCl*: m.p. 171°. *B,HBr*: m.p. 176°. *B,HI*: m.p. 177°.

Propyl ester: cryst. M.p. 79-80°. *B,HCl*: m.p. 148°. *B,HBr*: m.p. 170°. *B,HI*: m.p. 164°.

Butyl ester: C₂₁H₂₁O₂N. MW, 319. Cryst. M.p. 64-5°. *B,HCl*: m.p. 118°. *B,HBr*: m.p. 123-6°. *B,HI*: m.p. 158°.

Isobutyl ester: C₂₁H₂₁O₂N. MW, 319. Cryst. M.p. 74-5°.

2-Chloroethyl ester: needles from EtOH-Et₂O. M.p. 81°.

Allyl ester: C₂₀H₁₇O₂N. MW, 303. Yellow needles from ligroin. M.p. 75-6°.

Chloride: C₁₇H₁₂ONC. MW, 281.5. *B,HCl*: m.p. 199° decomp.

Hydrazide: cryst. M.p. 216°.

Benzylidene-hydrazide: prisms from MeOH. M.p. 234°.

7-Methyl-2-phenylquinoline-4-carboxylic Acid

Methylbenzylidene-hydrazide: needles from EtOH. M.p. 227°.

Mossler, *Chem. Zentr.*, 1913, I, 560.

Rhodehamel, Stuart, U.S.P., 1,552,568, (*Chem. Abstracts*, 1926, 20, 424).

John, Schmit, *J. prakt. chem.*, 1931, 132, 15.

Busch, U.S.P., 1,816,003, (*Chem. Abstracts*, 1931, 25, 5513).

7-Methyl-2-phenylquinoline-4-carboxylic Acid (7-Methylcinchophene, 7-methyl-2-phenylcinchoninic acid).

Cryst. from AcOH or EtOH.Aq. M.p. 212-14°.

Borsche, *Ber.*, 1908, 41, 3888.

8-Methyl-2-phenylquinoline-4-carboxylic Acid (8-Methylcinchophene, 8-methyl-2-phenylcinchoninic acid, 8-methylatophan).

Yellow needles from EtOH. M.p. 245°. Sol. hot EtOH, Et₂O. Insol. H₂O.

Me ester: prisms from MeOH. M.p. 86°.

Et ester: plates from EtOH-Et₂O. M.p. 70°.

2-Chloroethyl ester: needles from MeOH-Et₂O. M.p. 84°.

Amide: needles from EtOH. M.p. 241°. Sol. many aliphatic alcohols, C₆H₆, toluene. Insol. Et₂O.

Diethylamide: needles from Et₂O. M.p. 107°. Sol. usual org. solvents.

Hydrazide: m.p. 222°.

Benzylidene-hydrazide: needles from xylene. M.p. 226°.

Methylbenzylidene-hydrazide: prisms from EtOH. M.p. 215°.

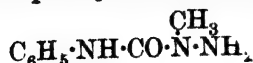
Johns, Schmit, *J. prakt. Chem.*, 1931, 132, 15.

Methyl phenyl selenide

C₇H₈Se MW, 171

Yellow oil with aromatic odour. B.p. 200-1°.

Pope, Neville, *J. Chem. Soc.*, 1902, 81, 1553.

2-Methyl-4-phenylsemicarbazide

C₈H₁₁ON₃ MW, 165

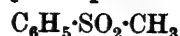
Cryst. M.p. 93-4°. Sol. EtOH, w-m C₆H₆. Spar. sol. Et₂O.

Busch, Opfermann, Walther, *Ber.*, 1904, 37, 2324.

Methyl phenyl sulphide.

See Thioanisole.

793

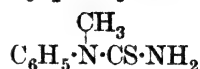
1-Methyl-4-phenylvaleraldehyde**Methyl phenyl sulphone**

C₇H₈O₂S MW, 156

Plates from H₂O. M.p. 88°. Very sol. EtOH, AcOEt, C₆H₆. Insol. cold H₂O, alkalis.

Otto, Artmann, *Ann.*, 1895, 284, 301.

Böeseken, van Ockenburg, *Rec. trav. chim.*, 1914, 33, 321.

unsym.-Methylphenylthiourea

C₈H₁₀N₂S MW, 166

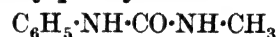
Plates from EtOH, prisms from H₂O. M.p. 107°. Heat with aniline → thiocarbanilide and methylaniline.

Wallach, *Ber.*, 1899, 32, 1874.

Gebhardt, *Ber.*, 1884, 17, 2094.

α-Methylphenyl-p-tolylmethane.

See 1-Phenyl-1-p-tolyloethane.

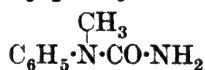
sym.-Methylphenylurea

C₈H₁₀ON₂ MW, 150

Leaflets from H₂O, prisms from EtOH. M.p. 151-2°. Sol. hot H₂O, hot EtOH, hot C₆H₆. Very stable towards acids and alkalis. Addn. of K₂Cr₂O₇ to sol. in conc. H₂SO₄ → violet col.

Sonn, *Ber.*, 1914, 47, 2442.

Scholl, Holdermann, *Ann.*, 1906, 345, 382.

unsym.-Methylphenylurea

C₈H₁₀ON₂ MW, 150

Cryst. from C₆H₆-ligroin. M.p. 82°. Very sol. usual org. solvents except ligroin. Insol. alkalis. Sweet taste.

Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, 51, 1800.

Thate, *Rec. trav. chim.*, 1929, 48, 116.

Methylphenylurethane.

See under N-Methylphenylcarbamic Acid.

1-Methyl-4-phenylvaleraldehyde

C₁₂H₁₆O MW, 176

B.p. 148-52°/21 mm., 110°/4 mm.

Semicarbazone: m.p. 112°.

Ramart-Lucas, Labaune, *Ann. chim.*, 1931, 16, 294.

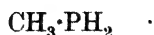
v. Braun, Kirschbaum, *Ber.*, 1914, 47, 267.

2-Methyl-2-phenylvaleric Acid.See β -Methyl- β -ethylhydrocinnamic Acid.**3-Methyl-1-phenylvaleric Acid.**

See 1-Phenylisocaproic Acid.

Methylphloroglucinol.

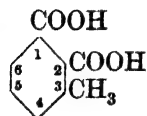
See 2 : 4 : 6-Trihydroxytoluene.

Methylphosphine CH_3P

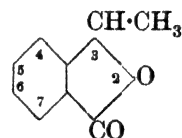
MW, 48

Gas. B.p. $-14^\circ/758.5$ mm. Prac. insol. H_2O . Salts decomp. by H_2O .Hofmann, *Ber.*, 1871, 4, 605; 1873, 6, 302.Berthaud, *Bull. soc. chim.*, 1907, 1, 146.**Methylphosphinic Acid** $\text{CH}_3\text{O}_3\text{P}$

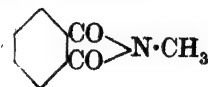
MW, 96

Hygroscopic cryst. M.p. 105° . Sol. H_2O , EtOH, Et₂O.*Di-Me ester*: $\text{C}_3\text{H}_9\text{O}_3\text{P}$. MW, 124. B.p. $181^\circ/754$ mm.*Di-Et ester*: $\text{C}_5\text{H}_{13}\text{O}_3\text{P}$. MW, 152. B.p. $192-4^\circ$. D_4^{20} 1.0726, D_4^{25} 1.0508. Sol. H_2O .*Dichloride*: $\text{CH}_3\text{OCl}_2\text{P}$. MW, 133. Cryst. M.p. 32° . B.p. 163° .*Di-diethylamide*: $\text{C}_9\text{H}_{23}\text{ON}_2\text{P}$. MW, 206. Oil with aromatic odour. B.p. $145-8^\circ/22$ mm. Sol. EtOH, Et₂O. Spar. sol. H_2O .*Di-dipropylamide*: $\text{C}_{13}\text{H}_{31}\text{ON}_2\text{P}$. MW, 262. B.p. $176-80^\circ/25$ mm. Sol. Et₂O.Hofmann, *Ber.*, 1872, 5, 105; 1873, 6, 306.Michaelis, Kaehne, *Ber.*, 1898, 31, 1054.**3-Methylphthalic Acid (Toluene-2 : 3-dicarboxylic acid)** $\text{C}_9\text{H}_8\text{O}_4$

MW, 180

Needles from AcOEt. M.p. 157° . Spar. sol. C_6H_6 , ligroin, pet. ether.*Dinitrile*: 2 : 3-dicyanotoluene. $\text{C}_9\text{H}_6\text{N}_2$. MW, 142. Needles from EtOH or C_6H_6 . M.p. 143° . Volatile in steam. Insol. Me_2CO , AcOEt.*1-Me ester 2-nitrile*: $\text{C}_{10}\text{H}_9\text{O}_2\text{N}$. MW, 175. Needles from ligroin. M.p. $68-70^\circ$.*Anhydride*: $\text{C}_9\text{H}_6\text{O}_3$. MW, 162. Sublimes in needles. M.p. $114-15^\circ$ ($109-10^\circ$).*Imide*: 3-methylphthalimide. $\text{C}_9\text{H}_7\text{O}_2\text{N}$. MW, 161. M.p. $189-90^\circ$.Mayer, Stark, *Ber.*, 1931, 64, 2003.Jürgens, *Ber.*, 1907, 40, 4413.Gabriel, Thieme, *Ber.*, 1919, 52, 1082.**4-Methylphthalic Acid (Toluene-3 : 4-dicarboxylic acid).**Cryst. from H_2O . M.p. 152° . Very sol. H_2O , EtOH, AcOEt, Me_2CO . Spar. sol. boiling CHCl_3 , boiling C_6H_6 .*Dinitrile*: 3 : 4-dicyanotoluene. Needles from H_2O . M.p. 120° (117°). Sol. EtOH, Et₂O, C_6H_6 . Insol. pet. ether. Volatile in steam.*1-Me ester 2-nitrile*: m.p. 68° . B.p. $284-90^\circ$.*Diamide*: $\text{C}_9\text{H}_{10}\text{O}_2\text{N}_2$. MW, 178. Needles. M.p. 188° . Sol. H_2O .*Anhydride*: needles. M.p. 92° . B.p. 295° . Very sol. EtOH, CHCl_3 , C_6H_6 .*Imide*: 4-methylphthalimide. Needles from EtOH. M.p. 196° . Sol. H_2O , Me_2CO . N-p-Tolyl: cryst. M.p. 180° . Sol. CHCl_3 , AcOEt, C_6H_6 . Insol. H_2O .Findelee, *Ber.*, 1905, 38, 3543.Mayer, Günther, *Ber.*, 1930, 63, 1458.**3-Methylphthalide** $\text{C}_9\text{H}_8\text{O}_2$

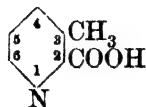
MW, 148

M.p. 8° . B.p. $284.5-285.5^\circ$ ($275-6^\circ$). Sol. EtOH, Et₂O. Spar. sol. pet. ether. Insol. H_2O , cold alkalis. Volatile in steam.Tasman, *Rec. trav. chim.*, 1927, 46, 671.**5-Methylphthalide.**Needles from pet. ether. M.p. 119° . Sol. hot dil. NaOH.Mayer, Schäfer, Rosenbach, *Chem. Abstracts*, 1930, 24, 839.Perkin, Stone, *Chem. Soc.*, 1925, 127, 2285.**N-Methylphthalimide** $\text{C}_9\text{H}_7\text{O}_2\text{N}$

MW, 161

Needles from EtOH. Aq. M.p. $133-4^\circ$. B.p. 285° . Sublimes in leaflets. Sol. EtOH. Prac. insol. cold H_2O .Bülow, Deseniss, *Ber.*, 1906, 39, 2278.Breslau, Pictet, *Ber.*, 1907, 40, 3784.

3-Methylpicolinic Acid (3-Methylpyridine-2-carboxylic acid, β -picoline-2-carboxylic acid)



$C_7H_7O_2N$ MW, 137
Prisms from EtOH. M.p. 111°. Very sol. H_2O .

$B_2H_2PtCl_6 \cdot 2H_2O$: prisms from EtOH. M.p. 192° decomp. Sol. H_2O .

Zincke, Winzheimer, *Ann.*, 1896, **290**, 355.

6-Methylpicolinic Acid (6-Methylpyridine-2-carboxylic acid, α -picoline-6-carboxylic acid)

Needles. M.p. 127° (96–7°, 84–5°).

Me ester: $C_8H_9O_2N_2$. MW, 151. Needles from $CHCl_3$. M.p. 29°.

Et ester: $C_9H_{11}ON_2$. MW, 165. B.p. 245°, 133°/35 mm.

Amide: $C_7H_8ON_2$. MW, 136. Needles from H_2O . M.p. 116°.

Hydrochloride: cryst. from EtOH– Et_2O . M.p. 202.5–203.5° decomp.

Cu salt: blue cryst. + $1H_2O$. M.p. 253–5° decomp.

Meyer, *Rec. trav. chim.*, 1925, **44**, 328.

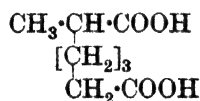
Winterfeld, Holschneider, *Ber.*, 1931, **64**, 148.

Koenigs, Happe, *Ber.*, 1903, **36**, 2908.

Methylpimanthrene.

See Homopimanthrene.

1-Methylpimelic Acid (Hexane-1:5-dicarboxylic acid)



$C_8H_{14}O_4$ MW, 174

Cryst. from C_6H_6 . M.p. 59°. B.p. 223–4°/15 mm. $k = 3.15 \times 10^{-5}$ at 25°. Dist. with lime \rightarrow 2-methylcyclohexanone.

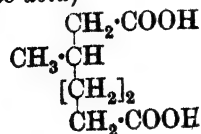
Di-Et ester: $C_{12}H_{22}O_4$. MW, 230. B.p. 140°/12 mm. (132–7°/23 mm.).

Dianilide: $C_{20}H_{22}O_2N_2$. MW, 322. Needles from EtOH.Aq. M.p. 166–°.

Einhorn, Ehret, *Ann.*, 1897, **295**, 175.

Dieckmann, *Ann.*, 1901, **47**, 108.

2-Methylpimelic Acid (2-Methylpentane-1:5-dicarboxylic acid)



$C_8H_{14}O_4$

MW, 174

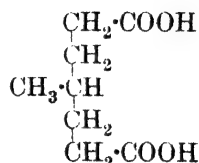
Cryst. M.p. 48–50°. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Insol. ligroin. Dist. with lime \rightarrow 3-methylcyclohexanone.

Di-Et ester: b.p. 155–60°/25 mm.

Dianilide: cryst. from EtOH.Aq. M.p. 136°.

Einhorn, Ehret, *Ann.*, 1897, **295**, 180.

3-Methylpimelic Acid (3-Methylpentane-1:5-dicarboxylic acid)



$C_8H_{14}O_4$

MW, 174

Plates from H_2O . M.p. 56–7°. Sol. EtOH, Et_2O , C_6H_6 . Dist. with lime \rightarrow 4-methylcyclohexanone.

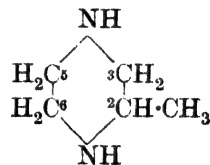
Ca salt: sol. H_2O . Insol. abs. EtOH.

Di-Et ester: yellowish oil. B.p. 160–7°/31 mm.

Dianilide: needles from EtOH.Aq. M.p. 158–9°.

Einhorn, Ehret, *Ann.*, 1897, **295**, 185.

2-Methylpiperazine



$C_5H_{12}N_2$

MW, 100

Leaflets. M.p. 62°. B.p. 155–155.5°. Sol. H_2O , EtOH, $CHCl_3$, C_6H_6 .

B,2HCl: needles from EtOH. M.p. 248–9°. Very sol. H_2O .

B,2HAuCl4: m.p. 220° decomp. (235°). Spar. sol. H_2O , EtOH.

Dinitroso deriv.: plates from H_2O . M.p. 71°. Sol. EtOH. Spar. sol. Et_2O .

1:4-N-Dibenzoyl: leaflets from EtOH.Aq. M.p. anhyd. 146–7°. Very sol. EtOH. Spar. sol. Et_2O .

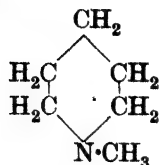
1:4-N-Di-p-toluenesulphonyl: cryst. from EtOH. M.p. 174°. Sol. Me_2CO .

Picrate: yellow plates. Decomp. at 276–8°.

Stoehr, *J. prakt. Chem.*, 1895, **51**, 472.

Esch, Marckwald, *Ber.*, 1900, **33**, 762.

Wrede, Bruch, Keil, *Z. physiol. Chem.*, 1931, **200**, 133.

N-Methylpiperidine (Methylpiperidylamine) $C_6H_{13}N$

MW, 99

B.p. 107°. D_4^{20} 0.820. $n_D^{21.6}$ 1.4378. B, HCl : very hygroscopic needles. M.p. 185°. B, HBr : m.p. 182-4°. $B_2H_2PtCl_6$: orange needles or plates from EtOH. M.p. 210-12° decomp. (194°). Sol. H_2O . Spar. sol. EtOH.

Methobromide: m.p. 175-80°.

Methiodide: prisms from EtOH. Decomp. at 334°.

Picrate: m.p. 148°.

v. Braun, Müller, Beschke, *Ber.*, 1906, 39, 4351.Haase, Wolfenstein, *Ber.*, 1904, 37, 3233.
Eschweiler, *Ber.*, 1905, 38, 881.**Methylpiperidine.**

See Pipecoline.

N-Methylpiperidine-carboxylic Acid.

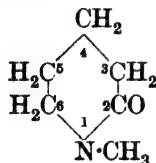
See under Hexahydronicotinic Acid and Hexahypicolic Acid.

N-Methylpiperidine-2 : 6-diacetic Acid.

See Lobelinic Acid.

N-Methylpiperidine-2 : 6-dicarboxylic Acid.

See Scopolinic Acid.

N-Methyl-2-piperidone $C_6H_{11}ON$

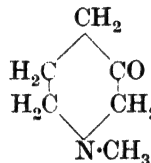
MW, 113

Hygroscopic liq. B.p. 102°/12 mm., 94-5°/9 mm. D_4^{25} 1.0293. n_D^{25} 1.4801. Misc. with H_2O , EtOH, Et_2O . 20% HCl at 160° → 4-methylaminovaleric acid. B, HCl : cryst. from EtOH- Et_2O . M.p. 104°. $B, HgCl_2, H_2O$: needles from H_2O . M.p. 119-20°.Prill, McElvain, *J. Am. Chem. Soc.*, 1933, 55, 1241.Räth, *Ann.*, 1931, 489, 113.**3-Methyl-2-piperidone.**

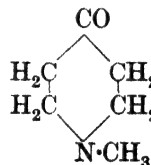
Hygroscopic cryst. from ligroin. M.p. 53-5-

55°. B.p. 249-50°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. cold ligroin.Aschan, *Ber.*, 1891, 24, 2445.**4-Methyl-2-piperidone.**

M.p. 87°. B.p. 147-8°/15 mm.

 B, HCl : m.p. 148-9°.Wallach, *Ann.*, 1900, 312, 184.**6-Methyl-2-piperidone.**Leaflets from AcOEt. M.p. 84°. Sol. H_2O , EtOH, Et_2O .Bunzel, *Ber.*, 1889, 22, 1056.**N-Methyl-3-piperidone** $C_6H_{11}ON$

MW, 113

B.p. 63-4°/13 mm. D_4^{25} 0.9684. n_D^{25} 1.4559. B, HCl : m.p. 110-11°.Prill, McElvain, *J. Am. Chem. Soc.*, 1933, 55, 1241.**N-Methyl-4-piperidone** $C_6H_{11}ON$

MW, 113

B.p. 56-8°/11 mm. D_4^{25} 0.9725. n_D^{25} 1.4580. B, HCl : m.p. 94-5°.

See previous reference.

Methylpiperidylamine.

See N-Methylpiperidine.

Methylpiperidyl-ethylene.

See Methylvinylpiperidine.

N-Methylproline

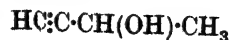
See Hygric Acid.

2-Methylpropylene-1 : 3-diol.

See 2-Methylglutaraldehyde.

2-Methylpropylene-1 : 2 : 3-tricarboxylic Acid.

See 2-Methyltricarballic Acid.

1-Methylpropargyl Alcohol (1-Butinol-3, 1-hydroxyethylacetylene) C_4H_6O

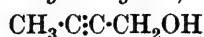
MW, 70

Lachrymatory oil. B.p. 106.5–107.5°. D_{20}^{20} 0.8858. n_D^{20} 1.4265.

Lespieau, *Bull. soc. chim.*, 1926, **39**, 993.

Hess, Munderloh, *Ber.*, 1918, **51**, 383.

3-Methylpropargyl Alcohol (2-Butinol-1, methyl-hydroxymethyl-acetylene)



$\text{C}_4\text{H}_6\text{O}$ MW, 70

B.p. 141–3°, 52–3°/14 mm. D_{21}^{21} 0.958. n_D^{21} 1.453.

Acetyl: b.p. 156–8°. D_{20}^{20} 0.995. n_D^{20} 1.434.

Me ether: $\text{C}_5\text{H}_8\text{O}$. MW, 84. B.p. 100–1°. D_{21}^{21} 0.854. n_D^{21} 1.423.

Yvon, *Compt. rend.*, 1925, **180**, 748.

Methylpropargylamine



$\text{C}_4\text{H}_7\text{N}$ MW, 69

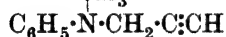
Liq. with ammoniacal odour.

B.HI: needles. M.p. 83°.

Acid oxalate: needles from EtOH. M.p. 141°. Spar. sol. EtOH.

Paal, Hermann, *Ber.*, 1889, **22**, 3083.

Methylpropargylaniline



$\text{C}_{10}\text{H}_{11}\text{N}$ MW, 145

B.p. 108–10°/13 mm.

Hydrochloride: needles from EtOH–Et₂O.

M.p. 142°.

Methiodide: cryst. from EtOH. M.p. 130–2°.

v. Braun, Fussgänger, Kühn, *Ann.*, 1925, **445**, 206.

Methyl propargyl Ether



$\text{C}_4\text{H}_6\text{O}$ MW, 70

B.p. 61–2°. D_{12}^{12} 0.83. Heat of comb. (vapour) C_p 603.83 Cal. $\text{NH}_3\cdot\text{AgNO}_3 \rightarrow$ lemon-yellow ppt.

Liebermann, *Ann.*, 1865, **135**, 287.

Henry, *Ber.*, 1872, **5**, 455.

Methylpropenylacetic Acid.

See 1-Methyl-2-ethylidenepropionic Acid.

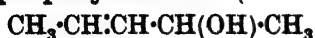
Methylpropenylacrylic Acid.

See 1-Methylsorbic Acid and 2-Methylsorbic Acid.

α -Methylpropenylbenzene.

See 2-Phenyl-2-butylene.

Methylpropenylcarbinol (2-Pentenol-4)



$\text{C}_5\text{H}_{10}\text{O}$ MW, 86

B.p. 122°, 79–80°/150 mm., 64°/62 mm. D_{17}^{17} 0.8382. n_D^{20} 1.4277.

Kyriakides, *J. Am. Chem. Soc.*, 1914, **36**, 663.

Baudrenghien, *Chem. Abstracts*, 1929, **23**, 4196.

Auwers, Westermann, *Ber.*, 1921, **54**, 2996.

Methyl propenyl Ketone.

See Ethylideneacetone.

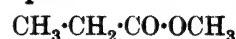
Methylpropenylphenol.

See Propenylcresol.

Methylpropionic Acid.

See Tetrolic Acid.

Methyl propionate



$\text{C}_4\text{H}_8\text{O}_2$ MW, 88

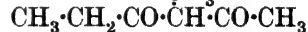
B.p. 79.7°. D_4^0 0.93871, D_{20}^{20} 0.9151, D_{17}^{17} 0.84225. $n_D^{18.9}$ 1.37697. Heat of comb. C_p 553.95 Cal. Crit. temp. 257.4°.

M.L.B., D.R.P., 315,021, (*Chem. Zentr.*, 1919, IV, 1104).

Young, Thomas, *J. Chem. Soc.*, 1893, **63**, 1219.

Pribram, Handl, *Monatsh.*, 1881, **2**, 681.

unsym. - Methylpropionylacetone (3-Methylhexandione - 2 : 4, 3-propionylbutanone, unsym. - acetylpropionylethane, 2 : 4-diketo-3-methylhexane)



$\text{C}_7\text{H}_{12}\text{O}_2$ MW, 128

Oil. B.p. 179–80°/730 mm., 85–7°/9–11 mm. Alc. $\text{FeCl}_3 \rightarrow$ intense bluish-purple col.

Cu salt: greenish-grey needles from C_6H_6 . M.p. 175–7° decomp.

Morgan, Drew, Ackermann, *J. Chem. Soc.*, 1924, **125**, 745.

Methylpropionophenone.

See Ethyl tolyl Ketone.

Methylpropylacetaldehyde.

See 1-Methylvaleraldehyde.

Methylpropylacetic Acid.

See 1-Methylvaleric Acid.

unsym.-Methylpropylacetone.

See 3-Methylhexanone-2.

Methylpropylacetylcarbinol.

See 3-Methyl-3-hexanolone-2.

Methylpropylacetylene.

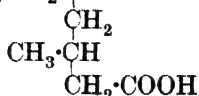
See 2-Hexine.

1-Methyl-2-propylacrylic Acid.

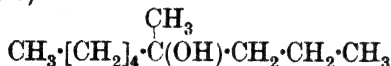
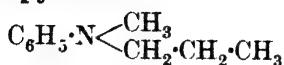
See 1-Methyl-1-hexenic Acid.

2-Methyl-2-propylacrylic Acid.

See 2-Methyl-1-hexenic Acid.

3-Methyl-1-propyladipic Acid (2-Methyl-heptane-1 : 4-dicarboxylic acid) $\text{C}_{10}\text{H}_{18}\text{O}_4$ MW, 202M.p. 110° . $[\alpha]_D + 27.53^\circ$ in EtOH. Spar. sol. H_2O , Et $_2\text{O}$.Haller, Desfontaines, *Compt. rend.*, 1905, 140, 1206.**Methylpropylallylcarbinol.**

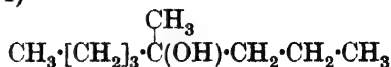
See 4-Methyl-1-heptenol-4.

Methylpropylamine $\text{C}_4\text{H}_{11}\text{N}$ MW, 73Liq. with fishy odour. B.p. $62-4^\circ$. $D_4^{17} 0.7204$.*B.HCl*: deliquescent plates from Et $_2\text{O}$. M.p. 140° .*N-Nitroso*: methylpropylnitrosamine. $\text{C}_4\text{H}_{10}\text{ON}_2$ MW, 102. B.p. 175° .*B.(COOH)* $_2$: plates. M.p. 155° .*B.* $_2\text{H}_2\text{PtCl}_6$: m.p. $200-2^\circ$ decomp. Sol. H_2O . Spar. sol. EtOH.*B.HAuCl* $_4$: yellow needles.*Picrate*: needles. M.p. 43° . Sol. H_2O , EtOH, Me $_2\text{CO}$.Graymore, *J. Chem. Soc.*, 1931, 1494.Stoermer, v. Lepel, *Ber.*, 1896, 29, 2113.**Methylpropylamylcarbinol** (4-Methyl-nonanol-4) $\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158B.p. $92-3^\circ/15$ mm. $n_D^{20} 1.4338$. $D_4^{25} 0.8245$.Whitmore, Williams, *J. Am. Chem. Soc.*, 1933, 55, 408.**Methylpropylaniline** $\text{C}_{10}\text{H}_{15}\text{N}$ MW, 149Yellowish oil. B.p. 225° (212°).*B.HCl*: m.p. 106° .*Picrate*: yellow cryst. from EtOH. M.p. 109° ($103-4^\circ$).Stoermer, v. Lepel, *Ber.*, 1896, 29, 2112.**Methylpropylbenzene.**

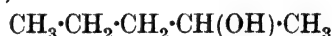
See Propyltoluene.

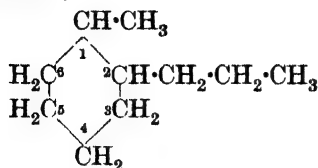
Methylpropylbenzoic Acid.

See Propyltoluic Acid.

Methylpropylbutylcarbinol (4-Methyloctanol-4) $\text{C}_9\text{H}_{20}\text{O}$ MW, 144Oil. B.p. $178-9^\circ/732$ mm., $78.5-79.5^\circ/15$ mm., $56.2-56.4^\circ/4$ mm. $D_4^{20} 0.8267$. $n_D^{20} 1.4327$.Whitmore, Woodburn, *J. Am. Chem. Soc.*, 1933, 55, 363.**1-Methyl-1-propylbutyric Acid.**

See 3-Methylhexane-3-carboxylic Acid.

Methylpropylcarbinol (sec.-n-Amyl alcohol, 2-pentanol) $\text{C}_5\text{H}_{12}\text{O}$ MW, 88*d.*B.p. $118.5-119.5^\circ$. $D_4^{20} 0.8103$. $n_D^{20} 1.4053$. $[\alpha]_D^{19} + 13.86^\circ$ ($[\alpha]_D^{20} + 7.65^\circ$).*Acetyl*: b.p. $130-1^\circ$. $D_4^{18} 0.8692$. $D_4^{21} 0.7916$. $n_D^{20} 1.3960$. $[\alpha]_D^{20} + 17.16^\circ$.*Acid phthalate*: m.p. 34° . $[\alpha]_D + 36.94^\circ$ in CHCl_3 .*Laurate*: b.p. $153^\circ/5$ mm. $D_4^{16} 0.8615$, $D_4^{19} 0.7795$. $n_D^{20} 1.4344$. $[\alpha]_D^{20} + 10.44^\circ$.*1-Naphthylurethane*: m.p. $88-91^\circ$. $[\alpha]_D^{20} + 13.3^\circ$ in EtOH.*l.*B.p. $116-20^\circ$. $[\alpha]_D^{20} - 9.06^\circ$.*1-Naphthylurethane*: cryst. from EtOH.Aq. M.p. $71-3^\circ$. $[\alpha]_D^{20} - 2.8^\circ$ in EtOH.*dl.*B.p. 118.9° . $D_4^{20} 0.8303$, $D_4^{25} 0.80528$. $n_D^{20} 1.4127$, $n_D^{25} 1.4041$. Sol. 6 vols. H_2O . Gives iodoform reaction.*Acetyl*: b.p. 133.5° .*Allophanate*: m.p. 154° .*Al deriv.*: $\text{Al}(\text{OC}_5\text{H}_{11})_3$. B.p. $210-12^\circ/8$ mm.*Acid phthalate*: m.p. $60-1^\circ$.*1-Naphthylurethane*: cryst. from ligroin. M.p. 76° (74.5°).*p-Xenylurethane*: m.p. 94.5° .*1-Nitroanthraquinone-2-carboxylate*: m.p. $136-7^\circ$.Wood, Scarf, *J. Soc. Chem. Ind.*, 1923, 42, 15r.Brunel, *J. Am. Chem. Soc.*, 1923, 45, 1337.Levene, Haller, Walti, *J. Biol. Chem.*, 1927, 72, 591.Pickard, Kenyon, *J. Chem. Soc.*, 1911, 99, 65.Skita, *Ber.*, 1915, 48, 1497.

1-Methyl-2-propylcyclohexane (2-Propyl-hexahydrotoluene)

$C_{10}H_{20}$ MW, 140
B.p. 175.5–176°/755.5 mm., 56°/13 mm. D_4^{19} 0.8130. n_D^{19} 1.4468.

Kuhn, Deutsch, *Ber.*, 1932, **65**, 47.

Signaigo, Cramer, *J. Am. Chem. Soc.*, 1933, **55**, 3332.

1-Methyl-3-propylcyclohexane (3-Propyl-hexahydrotoluene).

B.p. 164–5° (171–3°). D_4^{21} 0.7895. n_D^{20} 1.4377.

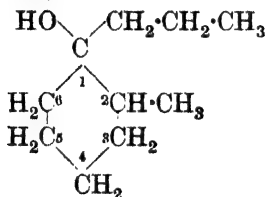
See second reference above and also

Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1085.

1-Methyl-4-propylcyclohexane (4-Propyl-hexahydrotoluene).

B.p. 174.3–177.1°. D_{20}^{20} 0.798. n_D^{20} 1.4393.

Signaigo, Cramer, *J. Am. Chem. Soc.*, 1933, **55**, 3332.

2-Methyl-1-propylcyclohexanol (2-Propyl-hexahydro-o-cresol)

$C_{10}H_{20}O$ MW, 156
Liq. with camphor-like odour. B.p. 97–8°/34 mm. D_{20}^{20} 0.919. n_D^{20} 1.48.
Acetyl: b.p. 107–10°/30 mm. D_{20}^{20} 0.956. n_D^{20} 1.469.

Murat, *Ann. chim. phys.*, 1909, **16**, 117.

3-Methyl-1-propylcyclohexanol (3-Propyl-hexahydro-m-cresol).

B.p. 198–200°, 96–8°/20 mm. D_4^{24} 0.8903. n_D^{24} 1.4566.

Acetyl: b.p. 108–10°/20 mm. D_{20}^{20} 0.9248. n_D^{20} 1.454.

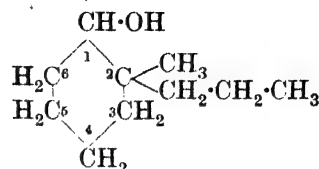
Phenylurethane: m.p. 112°.

Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1085.

4-Methyl-1-propylcyclohexanol (4-Propyl-hexahydro-p-cresol).

Liq. with odour resembling camphor. B.p. 97°/20 mm.

Sabatier, Mailhe, *Ann. chim.*, 1907, **10**, 560.

2-Methyl-2-propylcyclohexanol (1-Propyl-hexahydro-o-cresol)

$C_{10}H_{20}O$ MW, 156

B.p. 115°/25 mm. D_4^{25} 0.9146. n_D^{24} 1.46880. Forms an oily phenylurethane.

Cornubert, *Ann. chim.*, 1921, **16**, 203.

4-Methyl-2-propylcyclohexanol (3-Propyl-hexahydro-p-cresol).

Liq. with odour resembling menthol. B.p. 112°/18 mm. D_4^{42} 0.8944. n_D^{24} 1.46060.

Phenylurethane: m.p. 115°.

Cornubert, *Ann. chim.*, 1921, **16**, 206.

5-Methyl-2-propylcyclohexanol (4-Propyl-hexahydro-m-cresol).

l.

B.p. 113°/23 mm., 102–4°/15 mm. D_4^{19} 0.8976. $[\alpha]_D^{19}$ –18° 12'.

Acetyl: b.p. 227–30°.

dl.

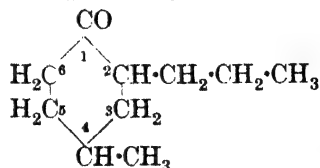
Liq. with odour resembling menthol. B.p. 107–8°/17 mm. D_4^{25} 0.8944. n_D^{24} 1.45981. Forms an oily phenylurethane.

Cornubert, *Ann. chim.*, 1921, **16**, 205.

6-Methyl-2-propylcyclohexanol (3-Propyl-hexahydro-o-cresol).

Liq. with odour resembling menthol. B.p. 115°/25 mm. Forms an oily phenylurethane.

Cornubert, *Compt. rend.*, 1914, **159**, 78.

4-Methyl-2-propylcyclohexanone

$C_{10}H_{18}O$ MW, 154

Liq. with odour resembling menthone. B.p. 217°/750 mm., 98°/12 mm. D_4^{24} 0.8914. n_D^{24} 1.45018.

Oxime: needles. M.p. 80–1°.

Cornubert, *Ann. chim.*, 1921, **16**, 193.

5-Methyl-2-propylcyclohexanone.*d.*

Liq. with odour resembling menthone. B.p. 217–21°, 97–8°/18 mm. D_4^{15} 0.8994. $[\alpha]_D^{20} + 3^\circ 21'$.

Semicarbazone : m.p. 158°.

dl.

B.p. 215–17°, 97°/12 mm. D_4^{24} 0.8944. n_D^{19} 1.4523.

Oxime : m.p. 87–8°.

Semicarbazone : m.p. 149–52°.

Cornubert, *Ann. chim.*, 1921, 16, 191.

6-Methyl-2-propylcyclohexanone.

Liq. with odour resembling menthone. B.p. 213–5°.

Oxime : plates. M.p. 70°.

Cornubert, *Compt. rend.*, 1914, 159, 77.

Methyl propyl Diketone.

See Acetylbutyryl.

2-Methylpropylene.

See Isobutylene.

2-Methylpropylenediamine.

See Isobutylenediamine.

Methyl propyl Ether $\text{C}_4\text{H}_{10}\text{O}$

MW, 74

B.p. 39°. D_4^{13} 0.7356. $n_D^{14.3}$ 1.36019.

Michael, Wilson, *Ber.*, 1906, 39, 2573.

Bennett, Philip, *J. Chem. Soc.*, 1928, 1931.

Methylpropylethylene.

See 2-Hexene and 2-Methyl-1-pentene.

1-Methyl-2-propylethylene Glycol.

See Hexandiol-2 : 3.

1-Methyl-3-propylglutaric Acid.

See Heptane-2 : 4-dicarboxylic Acid.

1-Methyl-3-propylglycerol.

See Heptantriol-2 : 3 : 4.

Methylpropylglyoxal.

See Acetylbutyryl.

Methylpropylglyoxime.

See under Acetylbutyryl.

1-Methyl-1-propylideneacetone.

See 3-Methyl-3-hexenone-2.

1-Methylpropylidene-malonic Acid.

See 2-Methyl-1-butylene-1 : 1-dicarboxylic Acid.

Methylpropylisobutylcarbinol.

2 : 4-Dimethylheptanol-4, *q.v.*

Methylpropylisopropylcarbinol.

See 2 : 3-Dimethylhexanol-3.

Methylpropylisopropylmethane.

See 2 : 3-Dimethyl-*n*-hexane.

Methylpropylketazine.

See under Methyl propyl Ketone.

Methyl propyl Ketone (2-Ketopentane, 2-pentanone) $\text{C}_5\text{H}_{10}\text{O}$

MW, 86

B.p. 102°. D_4^{15} 0.81236, D_4^{25} 0.80435, D_4^{20} 0.8089. $n_D^{20.2}$ 1.38946. Heat of comb. (liq.) C_p 740.6 Cal., C_v 739.5 Cal.; (vapour) C_p 754.19 Cal. H(+ Ni) at 130–50° \rightarrow methylpropylcarbinol.

Oxime : b.p. 167°. D_4^{20} 0.9095. n_D^{20} 1.4450.

Semicarbazone : m.p. 110°.

Azine : methylpropylketazine. B.p. 198–200°, 95°/12 mm. D_4^{24} 0.8330.

Phenylhydrazone : b.p. 153°/12 mm.

p-Nitrophenylhydrazone : m.p. 117°.

2 : 4 - Dinitrophenylhydrazone : yellowish - orange cryst. M.p. 141°.

Di-Et acetal : b.p. 57.4°/185 mm. D_4^{20} 0.8409.

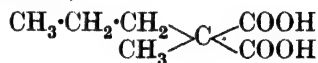
Wagner, Saytzeff, *Ann.*, 1875, 179, 322.

Meerwein, *Ann.*, 1913, 398, 249.

Senderens, *Ann. chim.*, 1913, 28, 301.

I.G., E.P., 318,124, (*Chem. Abstracts*, 1930, 24, 2140).

Commercial Solvents Corp., U.S.P., 1,757,830, (*Chem. Abstracts*, 1930, 24, 3247).

Methylpropylmalonic Acid (Pentane-2 : 2-dicarboxylic acid) $\text{C}_7\text{H}_{12}\text{O}_4$

MW, 160

Cryst. from C_6H_6 . M.p. 106–7° (96°). Sol. H_2O , Et_2O , CHCl_3 . $k = 2.12 \times 10^{-3}$ at 25°.

Di-Me ester : $\text{C}_9\text{H}_{16}\text{O}_4$. MW, 188. B.p. 206–9°, 101°/20 mm. D_4^{25} 1.0250. n_D 1.42445.

Di-Et ester : $\text{C}_{11}\text{H}_{20}\text{O}_4$. MW, 216. B.p. 220–3°.

Diamide : $\text{C}_7\text{H}_{14}\text{O}_2\text{N}_2$. MW, 158. Cryst. from H_2O . M.p. 182°.

Et ester-nitrile : $\text{C}_9\text{H}_{15}\text{O}_2\text{N}$. MW, 169. B.p. 216–22°.

Meyer, *Monatsh.*, 1906, 27, 1092.

Stiassny, *Monatsh.*, 1891, 12, 593.

Vogel, *J. Chem. Soc.*, 1934, 337, 340.

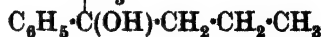
Methylpropylnitrosamine.

See under Methylpropylamine.

Methylpropylnonylcarbinol.

See 4-Methyltridecanol-4.

Methylpropylphenylcarbinol (2-Hydroxy-2-phenylpentane, 2-phenylpentanol-2, 2-phenyl-sec.-*n*-amyl alcohol)

 $\text{C}_{11}\text{H}_{16}\text{O}$

MW, 164

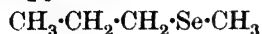
Oil. B.p. 216°, 112–13°/14 mm. $D_4^{21.5}$ 0.9723.

Klages, *Ber.*, 1902, **35**, 2643.

N-Methyl-2-propylpiperidine.

See N-Methylconiine.

Methyl propyl selenide

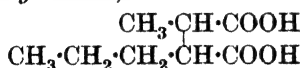


$\text{C}_4\text{H}_{10}\text{Se}$ MW, 137

B.p. 114°. $D_4^{20.4}$ 1.2445. $n_D^{20.4}$ 1.48121.

Tschugaeff, *Ber.*, 1909, **42**, 52.

1-Methyl-2-propylsuccinic Acid (Hexane-2 : 3-dicarboxylic acid)



$\text{C}_8\text{H}_{14}\text{O}_4$ MW, 174

Trans :

Needles. M.p. 158–60° (156–7°). Sol. EtOH, Et₂O, hot H₂O. Spar. sol. CHCl₃. Insol. C₆H₆. $k = 3.35 \times 10^{-4}$.

Anilic acid : m.p. 166–7°.

Cis :

Cryst. from C₆H₆. M.p. 92–3°. Sol. cold H₂O. $k = 2.71 \times 10^{-4}$.

Anilic acid : m.p. 82–4°.

Bone, Sprankling, *J. Chem. Soc.*, 1900, **77**, 1302.

Küster, Haas, *Ann.*, 1906, **346**, 21.

sym.-Methylpropylthiourea

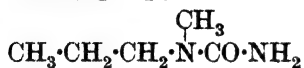


$\text{C}_5\text{H}_{12}\text{N}_2\text{S}$ MW, 132

Leaflets from EtOH.Aq. M.p. 79°. Sol. EtOH, Et₂O, CHCl₃, Me₂CO, CS₂, C₆H₆. Spar. sol. cold H₂O. Insol. ligroin.

Hecht, *Ber.*, 1890, **23**, 284.

unsym.-Methylpropylurea

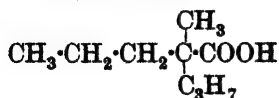


$\text{C}_5\text{H}_{12}\text{ON}_2$ MW, 116

Cryst. from C₆H₆. M.p. 95°. Sol. H₂O, EtOH, CHCl₃, hot C₆H₆. Spar. sol. Et₂O, ligroin.

Stoermer, v. Lepel, *Ber.*, 1896, **29**, 2114.

1-Methyl-1-propyl-n-valeric Acid (4-Methylheptane-4-carboxylic acid, methylpropyl-acetic acid, 1 : 1-dipropylpropionic acid)



$\text{C}_9\text{H}_{18}\text{O}_2$ MW, 158

Dict. of Org. Comp.—II.

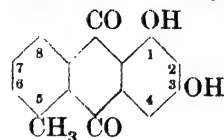
Leaflets. M.p. 44°. B.p. 118–22°/14 mm.

Meerwein, *Ann.*, 1919, **419**, 141.

2-Methylpurpuroxanthin.

See Rubiadin.

5-Methylpurpuroxanthin (5-Methylxantho-purpurin, 5 : 7-dihydroxy-1-methylanthraquinone)



$\text{C}_{15}\text{H}_{10}\text{O}_4$ MW, 254

Yellowish-brown needles from chlorobenzene. M.p. 285–6°.

Diacetyl : yellow needles from AcOH. M.p. 165–6°.

Mayer, Stark, *Ber.*, 1931, **64**, 2004, 2008.

6-Methylpurpuroxanthin (6-Methylxantho-purpurin, 5 : 7-dihydroxy-2-methylanthraquinone).

Present in small amount in root bark of *Morinda umbellata*. Yellow needles from cumene. M.p. 269° (267°). Sol. EtOH, AcOH. Spar. sol. Et₂O, C₆H₆. Sublimes in leaflets. Dist. with Zn dust → 2-methylanthracene.

Diacetyl : yellow needles from EtOH. M.p. 165–7°.

Mitter, Goswami, *J. Indian Chem. Soc.*, 1931, **8**, 688.

Perkin, Hummel, *J. Chem. Soc.*, 1894, **65**, 863.

7-Methylpurpuroxanthin (7-Methylxantho-purpurin, 6 : 8-dihydroxy-2-methylanthraquinone).

Yellow needles from AcOH. M.p. 297°. Conc. H₂SO₄ → blood-red sol. Alkalis or NH₄OH → cherry-red sol.

Mayer, Günther, *Ber.*, 1930, **63**, 1463.

8-Methylpurpuroxanthin (8-Methylxantho-purpurin, 6 : 8-dihydroxy-1-methylanthraquinone).

Orange prisms from Et₂O. M.p. 246°. Sol. EtOH, Et₂O. Sol. alkalis with red col.

Diacetyl : needles from EtOH. M.p. 195°.

Schunck, Marchlewski, *J. Chem. Soc.*, 1896, **69**, 70.

N-Methylputrescine (N-Methyltetramethylethylenediamine)



$\text{C}_5\text{H}_{14}\text{N}_2$ MW, 102

Chloroaurate : m.p. 192°.

Chloroplatinate : decomp. at 230.5°.

Mercurichloride : m.p. 149°.

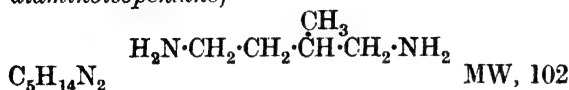
Dipicrate : m.p. 229–230.5°.

Picrolonate: decomp. at 254–5°.

NN'-Dibenzoyl: m.p. 115–5°.

Dudley, Thorpe, *Biochem. J.*, 1925, **19**, 845.

2-Methylputrescine (2-Methyltetramethylenediamine, 1:4-diamino-2-methylbutane, 1:4-diaminoisopentane)



d.

B.p. 170°. Fumes in air.

B,2HCl: cryst. from MeOH-Et₂O. M.p. 173°. $[\alpha]_D^{25} + 5.58$ in H₂O.

B, H₂PtCl₆: orange-yellow leaflets. Decomp. at 200°. Spar. sol. cold H₂O.

Dibenzoyl: cryst. from 96% EtOH. M.p. 154°. $[\alpha]_D^{18} + 1.19$ in Py.

Picrate: yellow needles. Decomp. at about 180°.

dl.

B.p. 172–3°. D_4^{20} 0.8836. $k = 5.4 \times 10^{-4}$ at 25°. Fumes strongly in air.

B,2HCl: needles from abs. EtOH. M.p. 144–5°.

B,2HAuCl₄: prisms. M.p. anhyd. 191°.

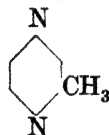
Picrate: needles. Decomp. at 150–60°.

v. Braun, Jostes, *Ber.*, 1926, **59**, 1093.

Euler, *Ber.*, 1895, **28**, 2954.

Bayer, D.R.P., 216,808, (*Chem. Zentr.*, 1910, I, 311).

2-Methylpyrazine (2-Methyl-1:4-diazine)



B.p. 136–7° (135°). D_4^{20} 1.0290. Misc. with H₂O, EtOH, Et₂O. Na + EtOH → 2-methylpiperazine.

B,2HgCl₂: needles from HCl. Decomp. at 194–5°.

B,HAuCl₄: yellow leaflets from HCl. M.p. 122–3° (rapid heat.), 180° (slow heat.). Cold H₂O → HCl + B₂AuCl₃.

B, AuCl₃: yellow needles. M.p. 145–6°.

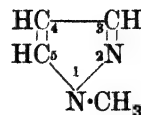
Picrate: yellow prisms from EtOH. M.p. 133°.

Methiodide: leaflets and needles from EtOH. M.p. 129–30°. Very sol. H₂O.

Brandes, Stöhr, *J. prakt. Chem.*, 1896, **54**, 490.

Stöhr, *J. prakt. Chem.*, 1895, **51**, 463.

1-Methylpyrazole



Oil with odour resembling pyridine. B.p. 127°. $D_4^{15.7}$ 0.9929. $n_D^{15.7}$ 1.47873.

B₂, H₂PtCl₆: orange prisms. M.p. 196–8° decomp.

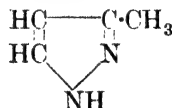
Picrate: yellow needles from EtOH. M.p. 148°.

Methiodide: prisms from EtOH. M.p. 190°.

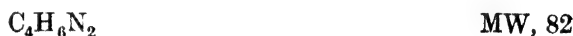
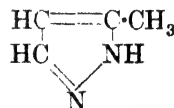
Knorr, *Ber.*, 1895, **28**, 716.

Auwers, Koolhaas, *Ann.*, 1924, **437**, 48.

3(5)-Methylpyrazole



or



B.p. 204–5°/730 mm. $D_4^{16.3}$ 1.0203. $n_D^{16.3}$ 1.49717. Misc. with H₂O, EtOH, Et₂O. Slowly volatile in steam.

N-Acetyl: prisms. M.p. 29–30°. B.p. 70–1°/10 mm.

N-Benzoyl: b.p. 155–7°/14 mm.

N-o-Nitrobenzoyl: needles from EtOH. M.p. 120°.

B₂, H₂PtCl₆, 2H₂O: m.p. 181° decomp. Sol. H₂O.

B₂, PtCl₄: yellow needles. M.p. 253° decomp.

B₂, AgNO₃: plates. M.p. 121°.

B₂, 3HgCl₂: needles. M.p. 165–8°.

Picrate: needles. M.p. 144°. Very sol. H₂O.

Knorr, Macdonald, *Ann.*, 1894, **279**, 217, 225.

Auwers, Daniel, *J. prakt. Chem.*, 1925, **110**, 256.

Auwers, Koolhaas, *Ann.*, 1924, **437**, 48.

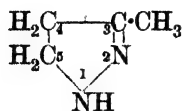
4-Methylpyrazole.

Oil. B.p. 204–5°/730 mm., 95°/13 mm. D_4^{20} 1.015. n_D^{20} 1.4920.

1-o-Nitrobenzoyl: needles from EtOH. M.p. 107°. B.p. 209–11°/15 mm. Sol. EtOH. Mod. sol. C₆H₆. Spar. sol. Et₂O.

Picrate: needles from H₂O. M.p. 142°.

Auwers, Cauer, *J. prakt. Chem.*, 1930, **126**, 166.

3-Methyl-2-pyrazoline (3-Methyl-4 : 5-dihydropyrazole) $C_4H_8N_2$

MW, 84

B.p. 56°/15 mm.

Picrate : m.p. 153°.

Phenylurea : plates. M.p. 109°.

Freudenberg, Stoll, *Ann.*, 1924, **440**, 44.**5-Methyl-2-pyrazoline** (5-Methyl-4 : 5-dihydropyrazole).B.p. 180° decomp., 73°/55 mm. Misc. with H_2O , EtOH, Et_2O , $CHCl_3$.

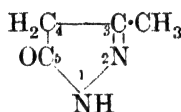
N-Benzoyl : m.p. 156°.

Picrate : cryst. from EtOH. M.p. 126°.

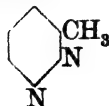
Phenylurea : cryst. from MeOH. M.p. 127°.

Maleic acid salt : needles. M.p. 134°.

See above reference.

3-Methylpyrazolone-5 $C_4H_6ON_2$

MW, 98

Prisms from H_2O . M.p. 215° (219°). Sublimes in leaflets. Spar. sol. hot EtOH.N-Acetyl : needles. M.p. 140°. Insol. Et_2O , C_6H_6 .4-Isonitroso : yellow needles. M.p. 194°. Sol. H_2O , EtOH.Thiele, Strange, *Ann.*, 1894, **283**, 30.**4-Methylpyrazolone-5.**Prisms from H_2O . M.p. 226-7°. Sol. H_2O , EtOH. Spar. sol. Et_2O . Insol. C_6H_6 .Auwers, Bähr, *J. prakt. Chem.*, 1927, **116**, 81 (Footnote).**3-Methylpyridazine** (3-Methyl-1 : 2-diazine) $C_5H_6N_2$

MW, 94

Oil. B.p. 214.5°. Misc. with H_2O . D_{20}^{25} 1.0486. Difficultly volatile in steam. Rapidly turns brown. Hygroscopic.

Picrate : needles. M.p. 143-4°.

Poppenberg, *Ber.*, 1901, **34**, 3265.**Methylpyridine.**

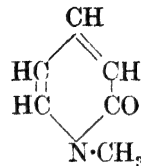
See Picoline.

Methylpyridine-2-carboxylic Acid.

See Methylpicolinic Acid.

Methylpyridine-3-carboxylic Acid.

See Methylnicotinic Acid and Homonicotinic Acid.

N-Methyl- α -pyridone C_6H_7ON

MW, 109

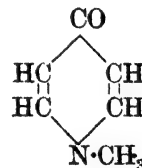
Liq. with aromatic odour. B.p. 250°/740 mm., 130°/14.5 mm., 126°/12.5 mm., 121°/10 mm. Solidifies in ice-salt freezing mixture. Strong base. Sol. H_2O , EtOH, Et_2O , $CHCl_3$, C_6H_6 . Turns greenish-yellow in light. B, HCl : needles. M.p. 166°. Sol. H_2O . In light or with $FeCl_3 \rightarrow$ reddish col. B, HBr : prisms. M.p. 174°. B_2, H_2PtCl_6 : m.p. 141°.Hydroquinone add. comp. : $B_2, C_6H_6O_2$. Prisms from EtOH. M.p. 118°.

p-Nitrophenol add. comp. : m.p. 62°.

Picrate : yellow needles from EtOH. M.p. 145°.

Picrolonate : yellow needles from EtOH. M.p. 120°.

Styphnate : yellow needles from EtOH. M.p. 162°.

Fischer, Chur, *J. prakt. Chem.*, 1916, **93**, 363.**N-Methyl- γ -pyridone** C_6H_7ON

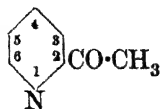
MW, 109

Hygroscopic cryst. M.p. 92-4°. B.p. 230-3°/13 mm.

 B_2, H_2PtCl_6 : m.p. anhyd. 176° decomp. $HgCl_2$ double salt : m.p. 177-80° decomp.Tschitschibabin, Ossetrowa, *Ber.*, 1925, **58**, 1711.**Methylpyridylamine.**

See Methylaminopyridine.

Methyl 2-pyridyl Ketone (2-Acetylpyridine, 2-acetopyridine)



C_7H_7ON

MW, 121

B.p. 192° ($188-9^\circ$). Sol. EtOH, Et₂O, acids. Turns yellow in air. Volatile in steam.

B, HCl: m.p. $183-5^\circ$ decomp.

B, HNO₃: m.p. 125° decomp.

Oxime: prisms from EtOH. M.p. 121° .

Phenylhydrazone: yellow cryst. from EtOH. M.p. 155° .

B, H₂PtCl₆: yellowish-red prisms. M.p. 220° .

Picrate: yellow needles from EtOH. M.p. 131° .

Methiodide: m.p. 161° .

Ethiodide: m.p. 205° .

Pinner, *Ber.*, 1901, **34**, 4240.

Engler, Rosumoff, *Ber.*, 1891, **24**, 2527.

Methyl 3-pyridyl Ketone (3-Acetylpyridine, 3-acetopyridine).

B.p. 220° . Sol. H₂O, EtOH, Et₂O, acids. Turns yellow in air. Volatile in steam.

B, HCl: m.p. 80° decomp.

Oxime: cryst. from C₆H₆. M.p. 113° .

Phenylhydrazone: needles from EtOH. M.p. 137° .

B, HgCl₂: needles from H₂O. M.p. 158° .

Binz, R  th, *Ann.*, 1931, **486**, 106.

La Forge, *J. Am. Chem. Soc.*, 1928, **50**, 2480.

Methyl 4-pyridyl Ketone (4-Acetylpyridine, 4-acetopyridine).

Oil. B.p. $212-14^\circ$. Very sol. EtOH, Et₂O, acids. Insol. H₂O.

B₂, H₂PtCl₆: leaflets. M.p. 205° .

B, HgCl₂: needles from EtOH. M.p. $183-4^\circ$.

Oxime: needles from EtOH. M.p. 142° .

Phenylhydrazone: yellow needles from EtOH. M.p. 150° .

Picrate: leaflets. M.p. $129-30^\circ$.

Pinner, *Ber.*, 1901, **34**, 4250.

2-Methylpyrimidine (2-Methyl-1:3-diazine)



$C_5H_6N_2$

MW, 94

M.p. -5° . B.p. $138^\circ/758$ mm. Misc. with H₂O.

Picrate: yellow needles. M.p. $106-7^\circ$ (sinters at 97°).

Gabriel, *Ber.*, 1904, **37**, 3642.

4-Methylpyrimidine (4-Methyl-1:3-diazine).

Oil. B.p. $141.5-142^\circ/762$ mm. D_{16}^{16} 1.031.

Misc. with H₂O. $Na + EtOH \rightarrow 1:3$ -diaminobutane.

B, 2HgCl₂: needles. M.p. 198° .

B, AuCl₃: needles. M.p. about 115° .

Picrate: plates or needles. M.p. $131-4^\circ$.

Gabriel, Colman, *Ber.*, 1899, **32**, 1534.

5-Methylpyrimidine (5-Methyl-1:3-diazine).

Needles or plates. M.p. 30.5° . B.p. $151.5^\circ/735$ mm. Misc. with H₂O.

B, AuCl₃: m.p. 209° .

HgCl₂ double salt: m.p. 246° .

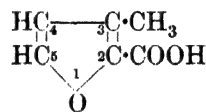
Picrate: m.p. 141° .

Gerngross, *Ber.*, 1905, **38**, 3396.

Methylpyrogallol.

See Trihydroxytoluene.

3-Methylpyromucic Acid (3-Methylfuran-2-carboxylic acid, elsholtzic acid, 3-methyl- α -furoic acid)



$C_6H_6O_3$

MW, 126

Needles from H₂O. M.p. 134° . Sublimes.

Me ester: $C_7H_8O_3$. MW, 140. Plates. M.p. $36-8^\circ$.

Et ester: $C_8H_{10}O_3$. MW, 154. Plates. M.p. $47-8^\circ$. B.p. 205° .

Chloride: $C_6H_5O_2Cl$. MW, 144.5. M.p. $21-2^\circ$. B.p. 192° .

Amide: $C_6H_7O_2N$. MW, 125. Plates. M.p. $90-90.5^\circ$.

Anilide: $C_{12}H_{11}O_2N$. MW, 201. Cryst. M.p. 91° .

Asahina et al., *Chem. Zentr.*, 1924, II, 1694.

Reichstein, Zschokke, Goerg, *Helv. Chim. Acta*, 1931, **14**, 1277.

4-Methylpyromucic Acid (4-Methylfuran-2-carboxylic acid, 4-methyl- α -furoic acid).

Needles from C₆H₆-pet. ether. M.p. $131-2^\circ$. Acid to Congo Red. $FeCl_3 \rightarrow$ orange ppt.

Nitrile: C_6H_5ON . MW, 107. Oil. B.p. $57-8^\circ/12$ mm.

Reichstein, Zschokke, *Helv. Chim. Acta*, 1931, **14**, 1275.

5-Methylpyromucic Acid (5-Methylfuran-2-carboxylic acid, 5-methyl- α -furoic acid).

Plates or needles from H_2O . M.p. 108–9°. Very sol. hot H_2O . Sol. EtOH, Et₂O, CHCl₃. Spar. sol. C₆H₆. Insol. CS₂. Sublimes easily.

Et ester: C₈H₁₀O₃. MW, 154. B.p. 213–14°/766 mm.

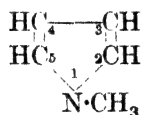
Me ester: C₇H₈O₃. MW, 140. B.p. 98°/15 mm.

Chloride: C₆H₅O₂Cl. MW, 144.5. Needles. M.p. 28°. B.p. 202°/756 mm., 93–4°/18 mm.

Amide: C₈H₇O₂N. MW, 125. Prisms from H₂O. M.p. 131°. Sol. EtOH, C₆H₆. Spar. sol. cold ligroin.

Hydrazide: m.p. 61–2°.

Hill, Sawyer, *Am. Chem. J.*, 1898, 20, 171.

N-Methylpyrrole

C₅H₇N MW, 81

B.p. 112–13° (114–15°/747.5 mm.). D₄¹⁵ 0.9145. n_D¹⁷ 1.48985.

HgCl₂ double salt: decomp. at 120–30°.

Pictet, Steinmann, *Ber.*, 1904, 37, 2792.

2-Methylpyrrole (α -Homopyrrole).

B.p. 148° (144.5–145.5°).

N-Acetyl: b.p. 197°. Insol. H₂O.

Fischer, Beller, Stern, *Ber.*, 1928, 61, 1078.

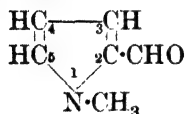
Pictet, Steinmann, *Ber.*, 1904, 37, 2792.

3-Methylpyrrole (β -Homopyrrole).

B.p. 142–3°/742.7 mm., 45°/11 mm.

Pictet, Steinmann, *Ber.*, 1904, 37, 2793.

Piloty, Hirsch, *Ann.*, 1913, 395, 71.

N-Methylpyrrole-2-aldehyde

C₆H₇ON MW, 109

Oil with odour resembling benzaldehyde. B.p. 72–4°/12 mm. Rapidly turns yellow, then purple, finally deep red. Stable to alkalis. Min. acids \rightarrow coloured tarry products.

Semicarbazone: cryst. from EtOH. M.p. 207–8°.

Phenylhydrazone: m.p. 127–8°.

Azine: yellow needles. M.p. 120°.

Reichstein, *Helv. Chim. Acta*, 1930, 13, 352.

3-Methylpyrrole-2-aldehyde.

Cryst. M.p. 95° (92°).

Phenylhydrazone: yellowish plates from EtOH. M.p. 124°.

Azine: yellow needles from EtOH.Aq. M.p. 201°.

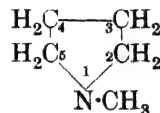
Fischer, Siedel, d'Ennequin, *Ann.*, 1933, 500, 194.

5-Methylpyrrole-2-aldehyde.

Cryst. from pot. ether. M.p. 70°.

Oxime: needles from EtOH. M.p. 153°.

Fischer, Beyer, Zaucker, *Ann.*, 1931, 486, 68.

N-Methylpyrrolidine

C₅H₁₁N MW, 85

B.p. 78–80°. Misc. with H₂O. Volatile in Et₂O vapour.

B₂H₂PtCl₆: m.p. 233°.

B.HAuCl₄: yellow needles and leaflets. M.p. 218°.

Picrate: yellow plates from EtOH. M.p. 221°.

Wibaut, *Rec. trav. chim.*, 1925, 44, 1101.

2-Methylpyrrolidine.

B.p. 95.5–96.5°/744 mm. D₂₀²⁰ 0.84.

B₂H₂PtCl₆.H₂O: yellow cryst. from EtOH-Et₂O. M.p. 172–3°, anhyd. decomp. at 206–7° (rapid heat.).

B.HAuCl₄: m.p. 184° (158–161°). Sol. EtOH.

Oxalate: m.p. 178–9° decomp.

N-Me: see 1:2-Dimethylpyrrolidine.

de Jong, Wibaut, *Rec. trav. chim.*, 1930, 49, 242.

v. Braun, *Ber.*, 1910, 43, 2870.

3-Methylpyrrolidine.

Liq. with odour resembling piperidine. B.p. 103–5°. D₄²⁰ 0.8654. Fumes strongly in air.

B₂H₂PtCl₆: prisms. Decomp. at 194°.

B.HAuCl₄: plates. M.p. 176°. Sol. H₂O.

Picrate: cryst. from EtOH. M.p. 106°.

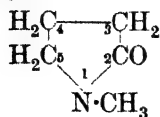
Späth, Breusch, *Monatsh.*, 1928, 50, 352.

Späth, Prokopp, *Ber.*, 1924, 57, 478.

N-Methylpyrrolidine-2-carboxylic Acid.

See Hygic Acid.

N-Methyl-2-pyrrolidone

 C_5H_9ON

MW, 99

B.p. 202° , $94-6^\circ/20$ mm., $84-5^\circ/14$ mm. D_{25}^{25} 1.0260. n_D^{25} 1.4666. Volatile in steam.

Hydrochloride: m.p. $79-81^\circ$.

Craig, *J. Am. Chem. Soc.*, 1933, **55**, 297.

Prill, McElvain, *ibid.*, 1241.

4-Methyl-2-pyrrolidone (2-Methylbutyrolactam).

B.p. $116^\circ/15$ mm.

Sircar, *J. Indian Chem. Soc.*, 1928, **5**, 553.

5-Methyl-2-pyrrolidone.

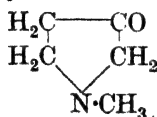
Deliquescent cryst. M.p. 37° . Very sol. H_2O , EtOH, Et_2O , C_6H_6 , warm ligroin. Heat with alkali \rightarrow 3-aminovaleric acid.

$B.HCl$: needles from Et_2O . M.p. 110° .

N -Acetyl: b.p. $224-6^\circ$. Misc. with EtOH, Et_2O , C_6H_6 . Mod. sol. H_2O .

Tafel, *Ber.*, 1889, **22**, 1862.

N-Methyl-3-pyrrolidone

 C_5H_9ON

MW, 99

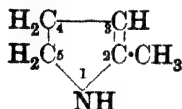
B.p. $46-7^\circ/18$ mm. D_{25}^{25} 0.9675. n_D^{25} 1.4431. $B.HCl$: m.p. $62-3^\circ$.

Prill, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 1241.

N-Methyl-2-pyrrolidone-5-acetic Acid.

See Ecgoninic Acid.

2-Methyl-2-pyrroline (2-Methyl-4 : 5-dihydropyrrole)

 C_5H_9N

MW, 83

Liq. with odour resembling pyridine. B.p. $95-7^\circ$, $50-1^\circ/110-16$ mm., $42-5^\circ/95-100$ mm. D_{22}^{22} 0.8995. Very sol. H_2O , EtOH, Et_2O . $Sn + HCl \rightarrow$ 2-methylpyrrolidine.

$B.HAuCl_4$: yellow needles from EtOH. M.p. about 157° decomp. Sol. EtOH, hot H_2O .

$B_2.H_2PtCl_6$: cryst. from EtOH. M.p. about 200° decomp. Very sol. H_2O .

N -Me: 1 : 2-dimethyl-2-pyrroline. B.p. $52-3^\circ/90$ mm. D_{22}^{22} 0.9333. $B.HI$: plates from

EtOH. M.p. about 260° decomp. $B.HAuCl_4$: needles. M.p. 159° . $B_2.H_2PtCl_6$: cryst. from EtOH. M.p. $172-3^\circ$ decomp.

Picrate: cryst. from EtOH. M.p. $120-1^\circ$.

Gabriel, *Ber.*, 1909, **42**, 1240, 1246.

Hielscher, *Ber.*, 1898, **31**, 277.

4-Methyl-2-pyrroline (4-Methyl-4 : 5-dihydropyrrole).

Present in small quantities in the fruit of *Piper nigrum*.

$B.HAuCl_4$: yellow leaflets from dil. HCl. M.p. 182° . Sol. H_2O .

$B_2.H_2PtCl_6$: orange prisms. M.p. 203° .

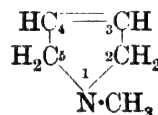
Picrate: m.p. $216-17^\circ$.

Picolonate: yellow cryst. from H_2O . M.p. 217° .

Pictet, Court, *Ber.*, 1907, **40**, 3777.

Pictet, Pictet, *Helv. Chim. Acta*, 1927, **10**, 594.

1-Methyl-3-pyrroline

 C_5H_9N

MW, 83

Present in tobacco leaves. Oil with amoniacal odour. B.p. $79-80^\circ$. Misc. with H_2O .

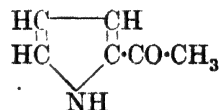
$B.HAuCl_4$: yellow leaflets from dil. HCl. M.p. $190-1^\circ$.

Picolonate: yellow prisms from H_2O . M.p. 222° .

Pictet, Court, *Ber.*, 1907, **40**, 3773.

Ciamician, Magnaghi, *Ber.*, 1885, **18**, 726.

Methyl 2-pyrrolyl Ketone (2-Acetopyrrole, 2-acetylpyrrole)

 C_6H_7ON

MW, 109

Cryst. from H_2O . M.p. 90° . B.p. 220° . Sol. H_2O , EtOH, Et_2O . Volatile in steam.

Oxime: needles from H_2O . M.p. $145-6^\circ$.

Semicarbazone: needles from H_2O . M.p. 190° .

Phenylhydrazone: m.p. 146° .

Azine: cryst. M.p. $212-13^\circ$.

de Jong, *Rec. trav. chim.*, 1929, **48**, 1029.

Oddo, *Ber.*, 1910, **43**, 1014.

2-Methylpyruvic Acid.

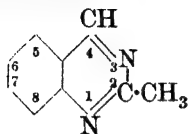
See 1-Ketobutyric Acid.

Methylquinaldine.

See 2:3-, 2:4-, 2:6-, 2:7-, and 2:8-Dimethylquinolines.

Methylquinaldinic Acid.

See Methylquinoline-2-carboxylic Acid.

2-Methylquinazoline

$C_9H_8N_2$

MW, 144

Needles from pet. ether. M.p. 41–2° (35.5°). B.p. 247.5–248°/768.5 mm., 237–9°/722 mm. Sol. EtOH, Et₂O. Less sol. H₂O.

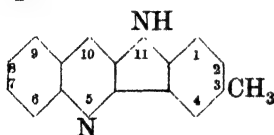
Bogert, Nabenhauer, *J. Am. Chem. Soc.*, 1924, **46**, 1933.

4-Methylquinazoline.

Pale yellow prisms. M.p. 36–7°. B.p. about 260°.

Picrate: yellowish-green flakes from EtOH. M.p. 183.5°.

See previous reference.

3-Methylquindoline

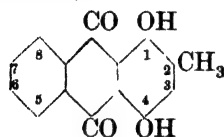
$C_{16}H_{12}N_2$

MW, 232

Needles from EtOH. M.p. 251°.

Acetyl: needles from EtOH. M.p. 164–5°.

Grandmougin, *Compt. rend.*, 1922, **174**, 1175.

2-Methylquinizarin (1:4-Dihydroxy-2-methylantranthraquinone)

$C_{15}H_{10}O_4$

MW, 254

Red needles. M.p. 177° (160°). Sol. C₆H₆, toluene, ligroin, with yellow col. Red sol. in hot AcOH. Sol. EtOH, Et₂O, with orange col. and green fluor. NaOH → bluish-violet sol. Sublimes.

Diacetyl: light yellow needles. M.p. 149–149.5°.

Ullmann, Schmidt, *Ber.*, 1919, **52**, 2110.

Keimatsu, Hirano, *Chem. Abstracts*, 1932, **26**, 982, 1601.

B.D.C., E.P., 176,925, (*Chem. Abstracts*, 1922, **16**, 3095).

5-Methylquinizarin (5:8-Dihydroxy-1-methylantranthraquinone).

Red needles from AcOH. M.p. 238–238.5° (232°). Conc. H₂SO₄ → red sol.

Diacetyl: yellow needles from Ac₂O. M.p. 224° (217°).

Mayer, Stark, *Ber.*, 1931, **64**, 2007.

Kuroda, *Chem. Abstracts*, 1919, **13**, 714.

6-Methylquinizarin (5:8-Dihydroxy-2-methylantranthraquinone).

Red needles from EtOH. M.p. 177° (165°). Sol. Me₂CO, C₆H₆, AcOH. Spar. sol. EtOH, Et₂O. Spar. sol. NaOH with violet col. Conc. H₂SO₄ → red sol.

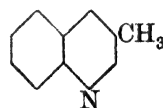
Diacetyl: yellow plates from EtOH. M.p. 204°. Sol. C₆H₆.

v. Niementowski, *Ber.*, 1900, **33**, 1634.

I.G., D.R.P., 544,522, (*Chem. Abstracts*, 1932, **26**, 3522).

2-Methylquinoline.

See Quinaldine.

3-Methylquinoline (β-Methylquinoline)

$C_{10}H_9N$

MW, 143

Prisms. M.p. 16–17° (10–14°). B.p. 252°/735 mm. D_4^{20} 1.0673. n_D^{20} 1.6171. Sol. dil. min. acids. Insol. alkalis. Volatile in steam.

B,HAuCl₄: orange needles. M.p. 145°. Spar. sol. cold H₂O.

B₂H₂PtCl₆: orange needles + 2H₂O. M.p. 249°.

B,AgNO₃: plates from EtOH. M.p. 180°.

Dichromate: red prisms from H₂O. M.p. 134°.

Picrate: yellow needles. M.p. 187°.

Methiodide: yellow needles from EtOH. M.p. 221°.

Ethiodide: yellow plates from EtOH. M.p. 220° decomp.

Isoamylodide: yellow plates from EtOH. M.p. 215°.

Wislicenus, Elvert, *Ber.*, 1909, **42**, 1145.

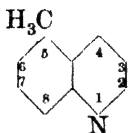
Doebner, v. Miller, *Ber.*, 1885, **18**, 1642.

Willmott, Simpson, *J. Chem. Soc.*, 1926, 2809.

4-Methylquinoline.

See Lepidine.

5-Methylquinoline (ana-Methylquinoline)

 $C_{10}H_9N$

MW, 143

B.p. 253–5°/735 mm. Misc. with EtOH, Et₂O. Spar. sol. H₂O.

Picrate: light yellow plates from EtOH. M.p. 210–13°. Spar. sol. H₂O, EtOH.

Methodide: yellow needles. M.p. 105°.

v. Jakubowski, *Ber.*, 1910, **43**, 3030.

6-Methylquinoline (p-Toluquinoline).

F.p. –22°. B.p. 257.4–258.6°/745 mm., 148°/27 mm. D_4^{20} 1.0654. n_D^{20} 1.6157. $k = 1.8 \times 10^{-9}$ at 25°.

$B_2, ZnCl_2$: prisms from EtOH. M.p. 229°.

Picrate: yellow powder. M.p. 229°. Spar. sol. EtOH, Et₂O, C₆H₆.

Methodide: yellow needles from EtOH. M.p. 214–16°.

Chlorostannate: m.p. 248°.

Druce, *Chem. News*, 1919, **119**, 271.

Skraup, *Monatsh.*, 1881, **2**, 158.

7-Methylquinoline (m-Toluquinoline).

F.p. 39°. B.p. 251.5–252.5°, 144°/18 mm. D_4^{20} 1.0609. n_D^{20} 1.6149. $k = 1.8 \times 10^{-9}$ at 25°.

B_2, H_2PtCl_6 : orange-yellow prisms + 2H₂O. M.p. 223–4°.

Picrate: cryst. from EtOH. M.p. 237°.

See first reference above and also

Skita, Brunner, *Monatsh.*, 1886, **7**, 140.

8-Methylquinoline (o-Toluquinoline).

B.p. 247.3–248.3°/751.3 mm., 143°/34 mm. Misc. with EtOH, Et₂O. Spar. sol. H₂O. D_4^{20} 1.0722. n_D^{20} 1.6162. $k = 1.1 \times 10^{-9}$ at 25°.

Picrate: yellow plates from EtOH. M.p. 200°. Spar. sol. EtOH. Almost insol. Et₂O, C₆H₆.

Methonitrate: cryst. M.p. about 72°. Very sol. H₂O.

Kneuppel, *Ber.*, 1896, **29**, 705.

Druce, *Chem. News*, 1918, **117**, 346.

2-Methylquinoline-carboxylic Acid.

See Quinaldine-carboxylic Acid.

3-Methylquinoline-2-carboxylic Acid (3-Methylquinaldine acid)

 $C_{11}H_9O_2N$

MW, 187

Needles or prisms from EtOH–Et₂O. M.p. 144° (142°). Loses CO₂ at 160°. Sublimes at 110°.

Doebner, v. Miller, *Ber.*, 1885, **18**, 1641.

Henze, *Ber.*, 1934, **67**, 753.

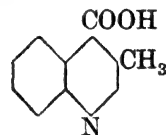
4-Methylquinoline-2-carboxylic Acid (Lepidine-3-carboxylic acid, 4-methylquinaldine acid).

Yellow cryst. powder + 1½H₂O from H₂O. M.p. anhyd. 153–4°.

B_2, H_2PtCl_6 : yellowish-red cryst. from H₂O. M.p. 210–12° decomp.

Koenigs, Mengel, *Ber.*, 1904, **37**, 1327.

3-Methylquinoline-4-carboxylic Acid (3-Methylcinchoninic acid)

 $C_{11}H_9O_2N$

MW, 187

Plates from H₂O. M.p. 254°. Sol. EtOH. Spar. sol. Me₂CO. Insol. Et₂O, C₆H₆, ligroin.

Me ester: C₁₂H₁₁O₂N. MW, 201. Needles from MeOH. M.p. 77°. Sol. MeOH, EtOH. Insol. Et₂O, C₆H₆.

Ester: C₁₃H₁₃O₂N. MW, 215. B_2, H_2PtCl_6 : orange plates from H₂O. M.p. 224–5°. *Picrate*: light yellow needles from EtOH. M.p. 175–6°.

Chloride: C₁₁H₈ONCl. MW, 205.5. Needles. M.p. 175°.

Amide: C₁₁H₁₀ON₂. MW, 186. Cryst. from EtOH. M.p. 229–30°.

Anilide: C₁₇H₁₄ON₂. MW, 262. Needles from EtOH.Aq. M.p. 238–9°.

B, HCl : needles. M.p. 240–1°.

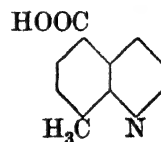
Picrate: yellow needles from EtOH, M.p. 222–3°.

v. Miller, *Ber.*, 1890, **23**, 2257.

Meyer, *Monatsh.*, 1906, **27**, 31.

Ornstein, *Ber.*, 1907, **40**, 1088.

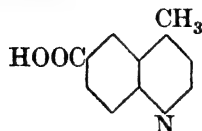
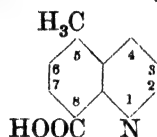
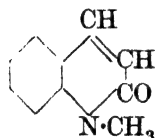
8-Methylquinoline-5-carboxylic Acid

 $C_{11}H_9O_2N$

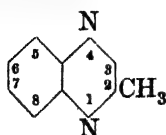
MW, 187

Powder. M.p. 286°. CaO → 8-methylquinoline.

Lellmann, Alt, *Ann.*, 1887, **237**, 310.

4-Methylquinoline-6-carboxylic Acid Acid
(*Lepidine-6-carboxylic acid*)C₁₁H₉O₂N MW, 187Needles from H₂O. M.p. 250–70° decomp.v. Miller, *Ber.*, 1890, 23, 2265.**5-Methylquinoline-8-carboxylic Acid** Acid
(*ana-Methylquinoline-o-carboxylic acid*)C₁₁H₉O₂N MW, 187Needles from H₂O. M.p. 173–4°. Sol. hot H₂O, EtOH, Et₂O, alkalis, min. acids. Insol. cold AcOH.Aq.*Picrate*: yellow needles from EtOH. M.p. 205–7°.v. Jakubowski, *Ber.*, 1910, 43, 3029.**6-Methylquinoline-8-carboxylic Acid.**
Needles from EtOH. M.p. 169°.Chakravarti, Venkatasubban, *Chem. Zentr.*, 1934, I, 1329.**N-Methyl-α-quinolone**C₁₀H₉ON MW, 159Needles from ligroin. M.p. 74°. B.p. 324°/728 mm. Sol. EtOH, Me₂CO, CHCl₃. Less sol. H₂O, ligroin.*B.HCl*: m.p. 112°.*B.HgCl₂*: prisms. M.p. 189°.Mills, Wishart, *J. Chem. Soc.*, 1920, 117, 585.**N-Methyl-γ-quinolone.**

See Echinopsine.

2-MethylquinoxalineC₉H₈N₂ MW, 144B.p. 245–7°. Misc. with H₂O. Reacts neutral.*B.HAuCl₄*: light yellow plates. M.p. 135° decomp.*B₂H₂PtCl₆*: yellow needles from HCl. Does not melt below 250°.*Picrate*: yellow cryst. M.p. 215°.Böttcher, *Ber.*, 1913, 46, 3085.**6-Methylquinoxaline (Toluquinoxaline).**B.p. 245°. D₄²⁰ 1.1164. Misc. with H₂O, EtOH, Et₂O, C₆H₆.*Oxalate*: needles from H₂O. M.p. 135–6°. Spar. sol. cold H₂O. Decomp. on warming.*Ethiodide*: yellowish-red cryst. M.p. 176° decomp. Sol. H₂O.Hinsberg, *Ann.*, 1887, 237, 336.**Methylresorcinol.**

See 2:4- and 2:6-Dihydroxytoluenes and Orcinol.

Methylrhamnoside.

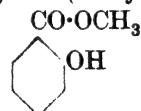
See under Rhamnose.

4-Methylrhodim.

See 4-Methyl-2-thiazolone.

Methylriboside.

See under Ribose.

Methylsalicylaldehyde.See 3-Hydroxy-*o*-toluic Aldehyde, 2-Hydroxy-*m*-toluic Aldehyde, 4-Hydroxy-*m*-toluic Aldehyde, and 3-Hydroxy-*p*-toluic Aldehyde.**Methyl salicylate (Oil of wintergreen)**C₈H₈O₃ MW, 152Found in some species of *Polygala*. F.p. –8–6°. B.p. 223.3°/760 mm., 101°/12 mm. D₄¹⁸ 1.1851, D₄²⁰ 1.1787. n_D¹⁸ 1.538. FeCl₃ → deep red col. Widely used as perfumery and flavouring material.*Me ether*: see under *o*-Methoxybenzoic Acid.*Et ether*: see under *o*-Ethoxybenzoic Acid.*β*-Bromoethyl ether: C₁₀H₁₁O₃Br. MW, 259. Plates from EtOH. M.p. 37.5–38°. B.p. 186–8°/20 mm. Sol. usual solvents.*Propyl ether*: C₁₁H₁₄O₃. MW, 194. B.p. 157–63°/45 mm.*Isopropyl ether*: C₁₁H₁₄O₃. MW, 194. B.p. 250°, 140–5°/16 mm. D₂₀ 1.062.*Isoamyl ether*: C₁₃H₁₈O₃. MW, 222. B.p. 160–4°/14 mm.*Allyl ether*: C₁₁H₁₂O₃. MW, 192. B.p. 245°, 163°/20 mm., 143°/12 mm. D₁₅ 1.118.*Phenyl ether*: C₁₄H₁₂O₃. MW, 228. B.p. 312°. Bitter taste.

Benzyl ether: $C_{15}H_{14}O_3$. MW, 242. Prisms. M.p. $46-7^\circ$. B.p. $215-17^\circ/15$ mm.

p-Nitrobenzyl ether: m.p. 128.2° .

Acetyl: see under Acetylsalicylic Acid.

Chloroacetyl: cryst. M.p. 62° . B.p. $195-200^\circ/30$ mm.

Benzoyl: prisms from EtOH or $Et_2O-AcOEt$. M.p. 92° . B.p. $270-80^\circ/120$ mm. Antitherapeutic and antipyretic.

Phenylacetyl: cryst. M.p. about 50° . B.p. $166-8^\circ/2$ mm.

Glucoside: see Gaultherin.

Tijmstra, *Ber.*, 1905, **38**, 1377.

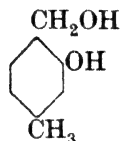
Cohen, Dudley, *J. Chem. Soc.*, 1910, **97**, 1742.

Montsanto Chemical Co., U.S.P., 1,945,177, (*Chem. Abstracts*, 1934, **28**, 2365).

Methylsalicylic Acid.

See 3-Hydroxy-*o*-toluic Acid, 2-Hydroxy-*m*-toluic Acid, 4-Hydroxy-*m*-toluic Acid, and 3-Hydroxy-*p*-toluic Acid.

4-Methylsaligenin (2-Hydroxy-4-methylbenzyl alcohol)



$C_8H_{10}O_2$ MW, 138

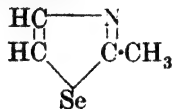
Cryst. from EtOH. M.p. 108° . B.p. 160° .

Megson, Drummond, *J. Soc. Chem. Ind.*, 1930, **49**, 251T.

5-Methylsaligenin.

See Homosaligenin.

2-Methylselenazole



C_4H_5NSe MW, 146

B.p. $32-4^\circ/20$ mm.

Kodak-Pathé, F.P., 757,767, (*Chem. Abstracts*, 1934, **28**, 3246).

1-Methylsemicarbazide



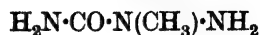
$C_2H_7ON_3$ MW, 89

Leaflets from C_6H_6 . M.p. 91.5° . Reduces $NH_3 \cdot AgNO_3$ and boiling Fehling's.

Oxalate: needles from EtOH.Aq. M.p. 171° decomp. Sol. H_2O . Spar. sol. EtOH.

Forster, Saville, *J. Chem. Soc.*, 1920, **117**, 759.

2-Methylsemicarbazide



$C_2H_7ON_3$ MW, 89

Needles from C_6H_6 . M.p. 113° . Sol. H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 , $CHCl_3$.

Oxalate: prisms from H_2O . M.p. 155° decomp. Spar. sol. EtOH.

v. Brünig, *Ann.*, 1889, **253**, 11.

Young, Oates, *J. Chem. Soc.*, 1901, **79**, 661.

4-Methylsemicarbazide

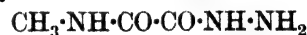


$C_2H_7ON_3$ MW, 89

Cryst. M.p. 118° (112°). Sol. H_2O , EtOH. Mod. sol. $CHCl_3$. Spar. sol. Et_2O . Reduces Fehling's.

Backer, *Rec. trav. chim.*, 1915, **34**, 194.

5-Methylsemioxamazide



$C_3H_7O_2N_3$ MW, 117

Needles from EtOH.Aq. M.p. 197° . Very sol. H_2O . Slightly sweet taste. Reduces cold $NH_3 \cdot AgNO_3$.

Tierie, *Rec. trav. chim.*, 1933, **52**, 357.

N-Methylskatole.

1 : 3-Dimethylindole, *q.v.*

1-Methylsorbic Acid (2 : 4-Hexadiene-2-carboxylic acid, 1-methyl-2-propenylacrylic acid)



$C_7H_{10}O_2$ MW, 126

Needles. M.p. $100-1^\circ$ ($90-2^\circ$). Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O , pet. ether.

Et ester: $C_9H_{14}O_2$. MW, 154. Oil. B.p. 207° , about $100^\circ/15$ mm. $D_4^{18.5}$ 0.9501, D_4^{20} 0.947. n_D^{20} 1.49907.

Auwers, Heyna, *Ann.*, 1923, **434**, 157.

2-Methylsorbic Acid (2-Methyl-2-propenylacrylic acid, 2-propenylcrotonic acid, 2-methyl-1 : 3-pentadiene-1-carboxylic acid)



$C_7H_{10}O_2$ MW, 126

Acid exists in two forms.

(i) Needles or plates from EtOH. M.p. 120° .

(ii) Cryst. from EtOH.Aq. M.p. $98-9^\circ$ ($74-6^\circ$). Very sol. org. solvents.

Me ester: $C_8H_{12}O_2$. MW, 140. B.p. $80-4^\circ/12$ mm. D_4^{18} 0.967. n_D^{20} 1.5010.

Et ester: $C_9H_{14}O_2$. MW, 154. B.p. 102–4°/17–18 mm.

Chloride: C_7H_9OCl . MW, 144.5. B.p. 94–5°/15 mm.

Amide: $C_7H_{11}ON$. MW, 125. Prisms from C_6H_6 . M.p. 147–8°.

Anilide: needles from EtOH. M.p. 134–5°.

Kuhn, Hoffer, *Ber.*, 1932, **65**, 655.

Burton, Ingold, *J. Chem. Soc.*, 1929, 2028.

3-Methylsorbic Acid (3-Methyl-1 : 3-pentadiene-1-carboxylic acid, 3-methyl-3-ethylidenecrotonic acid)

$CH_3 \cdot CH : \overset{\overset{CH_3}{|}}{C} : CH : CH \cdot COOH$
 $C_7H_{10}O_2$ MW, 126

Needles from EtOH.Aq. M.p. 94–5°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O , pet. ether.

Et ester: $C_9H_{14}O_2$. MW, 154. Oil. B.p. 98–9°/12 mm. $D_4^{15.6}$ 0.9499, D_4^{20} 0.946. n_D 1.50087.

Auwers, Heyna, *Ann.*, 1923, **434**, 162.

4-Methylsorbic Acid (4-Methyl-1 : 3-pentadiene-1-carboxylic acid, 3-isopropylidenecrotonic acid)

$CH_3 \cdot \overset{\overset{CH_3}{|}}{C} : CH : CH : CH \cdot COOH$
 $C_7H_{10}O_2$ MW, 126

Acid exists in two forms.

(i) Needles from pet. ether. M.p. 109–10°. Sol. MeOH, EtOH, Me_2CO , AcOH, AcOEt. Spar. sol. H_2O , C_6H_6 .

(ii) M.p. 17°. B.p. 123–4°/9 mm. Misc. with MeOH, EtOH, Et_2O , AcOH, Me_2CO , pet. ether. Spar. sol. H_2O .

Et ester: $C_9H_{14}O_2$. MW, 154. B.p. 82–3°/9 mm.

Fischer, Löwenberg, *Ann.*, 1932, **494**, 280.

1-Methylstearic Acid

$CH_3 \cdot [CH_2]_{15} \cdot \overset{\overset{CH_3}{|}}{CH} \cdot COOH$
 $C_{19}H_{38}O_2$ MW, 298

Powder from EtOH or pet. ether. M.p. 58°.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1927, **46**, 152r.

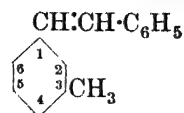
Methylstilbazole.

See Methylstyrylpyridine.

α -Methylstilbene.

See 1 : 2-Diphenylpropylene.

3-Methylstilbene (1-Phenyl-2-m-tolylethylene)



$C_{15}H_{14}$ MW, 194

Cryst. from EtOH. M.p. 52.5–53.5°. B.p. 206–7°/30 mm. Very sol. C_6H_6 , ligroin. Sol. AcOH, Et_2O . Mod. sol. cold MeOH.

Auwers, Frühling, *Ann.*, 1921, **422**, 221.

4-Methylstilbene (1-Phenyl-2-p-tolylethylene)

Plates with blue fluor. M.p. 120° (117°). Sol. Et_2O , C_6H_6 , $CHCl_3$. Less sol. EtOH. Distills undecomp.

Klages, Tetzner, *Ber.*, 1902, **35**, 3967.

Späth, *Monatsh.*, 1914, **35**, 469.

α -Methylstyrene (Isopropenylbenzene, 1-methyl-1-phenylethylene, 2-phenylpropylene)

$C_6H_5 \cdot \overset{\overset{CH_3}{|}}{C} : CH_2$
 C_9H_{10} MW, 118

B.p. 161–2°, 54.5–55°/14 mm. $D_4^{17.4}$ 0.9134. $n_D^{17.4}$ 1.5384. Heat of comb. C_p 1,203.1 Cal.

Sabetay, *Bull. soc. chim.*, 1930, **47**, 614.

Harries, *Ann.*, 1912, **390**, 265.

I.G., E.P., 682,569, (*Chem. Abstracts*, 1930, **24**, 4523).

β -Methylstyrene (Propenylbenzene, 1-methyl-2-phenylethylene, 1-phenylpropylene)

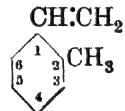
$C_6H_5 \cdot CH : CH \cdot CH_3$
 C_9H_{10} MW, 118

B.p. 176–7°. D_4^0 0.935. n_D^{16} 1.5903.

Nitrosite: m.p. 133°.

Lévy, Dvoretzka-Gombinska, *Bull. soc. chim.*, 1931, **49**, 1765.

o-Methylstyrene (o-Tolylethylene, 2-vinyl-toluene)



C_9H_{10} MW, 118

Oil. B.p. 169°/752 mm., 55.4°/12 mm. $D_4^{14.1}$ 0.9155. $n_D^{14.1}$ 1.549. Polymerises on heating.

Auwers, *Ann.*, 1917, **413**, 295.

m-Methylstyrene (m-Tolylethylene, 3-vinyl-toluene).

B.p. 164°, 61-2°/18 mm. Solidifies on standing.

Titley, *J. Chem. Soc.*, 1926, 517.

Müller, *Ber.*, 1887, 20, 1215.

p-Methylstyrene (p-Tolylethylene, 4-vinyl-toluene).

B.p. 170-5°, 77-9°/33 mm., 59-60°/12 mm. $D_4^{16.4}$ 0.9003. $n_D^{16.4}$ 1.5446.

See previous references and also

Auwers, *Ber.*, 1912, 45, 2777.

Gauthier, Gauthier, *Bull. soc. chim.*, 1933, 53, 323.

α -Methylstyryl bromide.

See β -Bromo- α -methylstyrene.

Methylstyrylcarbinol (γ -Hydroxy- α -butenylbenzene, 1-phenyl-1-butenol-3)



$C_{10}H_{12}O$ MW, 148

Thick oil. B.p. 144°/21 mm., 131°/12 mm. D_4^{22} 1.0134.

Klages, *Ber.*, 1906, 39, 2591.

Methyl styryl Ether



$C_9H_{10}O$ MW, 134

B.p. 210-13°, 102-3°/16 mm., 99°/13 mm. $D_0^{15.5}$ 1.001, $D_4^{23.3}$ 0.9894. $n_D^{15.5}$ 1.5647, $n_D^{24.3}$ 1.5620.

Moureu, *Bull. soc. chim.*, 1904, 31, 527.

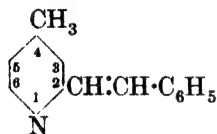
Auwers, *Ber.*, 1911, 44, 3519.

Ley, *Ber.*, 1918, 51, 1818.

Methyl styryl Ketone.

See Benzylideneacetone.

4-Methyl-2-styrylpyridine (2-Benzylidene-2:4-lutidine, 4-methyl- α -stilbazole)



$C_{14}H_{13}N$ MW, 195

Yellow oily liq. B.p. 321-6° part. decomp. D_4^1 1.0717. Sol. EtOH, Et₂O, CHCl₃, CS₂. Insol. H₂O.

B, HI : yellow needles from EtOH. M.p. 210-11°.

$B, H AuCl_4$: yellow needles. M.p. 141-2°.

$B_2, H_2 PtCl_6$: yellow needles. M.p. 183°.

Picrate: yellow needles. M.p. 192-3°.

Bachér, *Ber.*, 1888, 21, 3072.

6-Methyl-2-styrylpyridine (2-Benzylidene-2:6-lutidine, 6-methyl- α -stilbazole).

Pearly leaflets from EtOH.Aq. M.p. 123°.

Sol. EtOH, Et₂O, AcOH, Me₂CO, C₆H₆. Spar. volatile in steam.

B, HCl : pale yellow needles + H₂O. M.p. anhyd. 221° decomp.

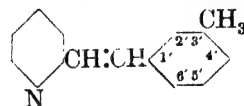
$B, H AuCl_4$: reddish needles. M.p. 211°. Spar. sol. H₂O, EtOH.

$B, HCl, HgCl_2$: needles. M.p. 185°. Sol. boiling H₂O, EtOH.

Picrate: golden needles. M.p. 217-19° decomp. Sol. H₂O, EtOH.

Schuster, *Ber.*, 1892, 25, 2399.

3'-Methyl-2-styrylpyridine (3'-Methyl- α -stilbazole, 1-m-tolyl-2- α -pyridylethylene)



$C_{14}H_{13}N$ MW, 195

Oil. B.p. 220°/45 mm. Sol. usual org. solvents. Insol. H₂O.

$B, H AuCl_4$: needles. M.p. 135-6°.

$B_2, H_2 PtCl_6$: m.p. 186-7°.

Picrate: m.p. 214-15°.

Freund, *Ber.*, 1906, 39, 2836.

4'-Methyl-2-styrylpyridine (4'-Methyl- α -stilbazole, 1-p-tolyl-2- α -pyridylethylene).

Needles from EtOH.Aq. M.p. 87° (82°). Sol. EtOH, Et₂O, Me₂CO, CHCl₃, CS₂. Insol. H₂O.

B, HCl : pale yellow needles + H₂O. M.p. 190-1°. Sol. EtOH, H₂O. Insol. Et₂O.

$B, HCl, HgCl_2$: yellow needles. M.p. 225° decomp. Sol. H₂O, EtOH. Insol. Et₂O.

B, HNO_3 : yellow cryst. M.p. 147°.

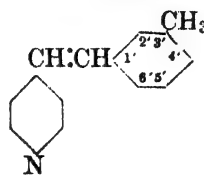
$B_2, H_2 PtCl_6$: yellow cryst. M.p. 194-5° decomp.

Picrate: yellow needles. M.p. 193-4°. Sol. H₂O, EtOH, Et₂O.

Dierig, *Ber.*, 1902, 35, 2774.

Shaw, Wagstaff, *J. Chem. Soc.*, 1933, 78.

3'-Methyl-4-styrylpyridine (3'-Methyl- γ -stilbazole, 1-m-tolyl-2- γ -pyridylethylene)



$C_{14}H_{13}N$ MW, 195

Oil. B.p. 220-5°/about 35 mm. Sol. EtOH, Et₂O, C₆H₆, CHCl₃, CS₂. Insol. H₂O.

$B, H AuCl_4$: m.p. 166-8°.

$B_2, H_2 PtCl_6$: m.p. 194-5°.

Picrate: yellow cryst. from EtOH.Aq. M.p. 194-6°.

Freund, *Ber.*, 1906, **39**, 2834.

4'-Methyl-4-styrylpyridine (4'-Methyl- γ -stilbazole, 1-p-tolyl-2- γ -pyridylethylene).

Cryst. from EtOH.Aq. M.p. 101-2°. Sol. EtOH, Et₂O, amyl alcohol.

B.HCl: yellow cryst. M.p. 120°. Very sol. H₂O, EtOH.

B.HBr: yellow needles. M.p. 176-7°.

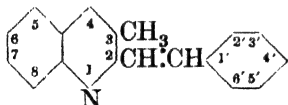
B.HAuCl₄: reddish-brown needles. M.p. 191° decomp.

B.HCl.HgCl₂: pale yellow needles. M.p. 208°.

B₂.H₂PtCl₆: pale yellow cryst. + 2H₂O. Decomp. at 193°.

Düring, *Ber.*, 1905, **38**, 164.

3-Methyl-2-styrylquinoline



C₁₈H₁₅N

MW, 245

Cryst. from pet. ether. M.p. 102°.

Bennett, Willis, *J. Chem. Soc.*, 1928, 1973.

4-Methyl-2-styrylquinoline.

Prisms from EtOH. M.p. 120-1°.

B.HCl: cryst. + 2H₂O. M.p. 221-2°.

Picrate: yellow needles from EtOH. Decomp. at 233-9°.

Fischer, Scheibe, *J. prakt. Chem.*, 1920, **100**, 93.

6-Methyl-2-styrylquinoline.

Prisms from EtOH. M.p. 137°. Sol. Me₂CO, CHCl₃. Spar. sol. Et₂O. Insol. H₂O, C₆H₆, ligroin.

B.HCl: greenish-yellow needles from EtOH.HCl. M.p. 243°.

B.HAuCl₄: yellow needles from EtOH. M.p. 215°.

B₂.H₂PtCl₆: yellow powder. Decomp. at 279°.

B.HCl.HgCl₂: greenish-yellow prisms. M.p. 223°.

Picrate: yellow needles. M.p. 234°.

Gasda, *Ber.*, 1905, **38**, 3700.

8-Methyl-2-styrylquinoline.

Plates from EtOH. M.p. 72°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃, AcOH, ligroin.

B.HCl: yellow needles. M.p. 113°. Sol. EtOH, hot dil. HCl.

B₂.H₂PtCl₆: yellow plates. M.p. 229-30°.

B₂.2HCl.AuCl₃: reddish-yellow cryst. from EtOH.HCl. M.p. 214°.

B₂.2HCl.HgCl₂: yellow plates from dil. HCl. M.p. 244°.

Hoffmann, *Ber.*, 1905, **38**, 3709.

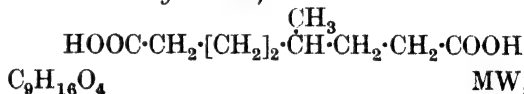
4'-Methyl-2-styrylquinoline (2-[p-Methylstyryl]-quinoline).

Pale yellow needles from EtOH. Sol. Et₂O, CS₂. Spar. sol. cold EtOH. Insol. H₂O.

B.HCl: pale yellow needles from dil. HCl. M.p. 218°.

v. Grabski, *Ber.*, 1902, **35**, 1957.

3-Methylsuberic Acid (3-Methylhexane-1:6-dicarboxylic acid)



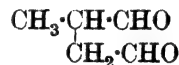
C₉H₁₆O₄

MW, 188

Cryst. from H₂O. M.p. 81°.

Ruzicka, Steiger, *Helv. Chim. Acta*, 1927, **10**, 688.

Methylsuccindialdehyde (Pyrotartaraldehyde)



C₅H₈O₂

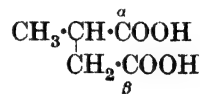
MW, 100

Free aldehyde not known.

Dioxime: needles from boiling AcOEt. M.p. 160°. Spar. sol. org. solvents. Sol. caustic alkalis, but not carbonates. Heat with 30% KOH \rightarrow methylsuccinic acid.

Oddo, Mameli, *Gazz. chim. ital.*, 1914, **44**, ii, 166.

Methylsuccinic Acid (Pyrotartaric acid)



C₅H₈O₄

MW, 132

d.

Cryst. from Et₂O-C₆H₆. M.p. 115°. [α]_D²⁰ + 9.89° in H₂O.

Quinine salt: m.p. 169-71°. 4.2 parts sol. 100 parts EtOH.

Acid strychnine salt: m.p. 186°.

Anhydride: see Methylsuccinic Anhydride.

l.

Cryst. from Et₂O-C₆H₆. M.p. about 102°. [α]_D²⁰ - 7.9° in H₂O.

dl.

Prisms. M.p. 115° (112°). Sol. 1.5 parts H₂O at 20°. Sol. EtOH, Et₂O. 0.35 parts sol. 100

parts cold CHCl_3 . Heat of comb. C_v 390.3 Cal. k (first) = 8.6×10^{-5} at 25° : (second) = 2.3×10^{-6} at 25° . Heat at $200^\circ \rightarrow$ anhydride.

Mono-Me ester: $C_6H_{10}O_4$. MW, 146. B.p. $153\text{--}153.5^\circ/20$ mm., $140^\circ/11$ mm. Sol. H_2O , usual org. solvents. $D_4^{20.7}$ 1.1436. $n_D^{20.7}$ 1.43230.

Di-Me ester: $C_7H_{12}O_4$. MW, 160. Oil. F.p. about -80° . B.p. $197^\circ/722$ mm., $101^\circ/22$ mm. D_4^{19} 1.0692. n_D^{19} 1.42042.

Mono-Et ester: $C_7H_{12}O_4$. MW, 160. Thick oil. B.p. $160\text{--}1^\circ/22$ mm. $D_4^{20.2}$ 1.0982. $n_D^{20.2}$ 1.43121.

Me-Et ester: $C_8H_{14}O_4$. MW, 174. Oil. B.p. $198\text{--}9^\circ/754.1$ mm., $101\text{--}2^\circ/20$ mm. $D_4^{21.9}$ 1.0123. $n_D^{21.9}$ 1.41952.

Di-Et ester: $C_8H_{16}O_4$. MW, 188. F.p. about -80° . B.p. $218^\circ/759$ mm., $125^\circ/33$ mm. $D_4^{19.1}$ 1.0123. $n_D^{19.1}$ 1.41984.

Di-active-amyl ester: $C_{15}H_{28}O_4$. MW, 272. B.p. $172^\circ/18$ mm. D_4^{20} 0.9529. n_D^{20} 1.4352. $[\alpha]_D^{20} + 3.67^\circ$.

Phenacyl ester: cryst. from EtOH. M.p. 101.5° .

Mono-l-bornyl ester: cryst. from EtOH. M.p. 73° . $[\alpha]_D^{18} - 34^\circ$ in EtOH.

Dimethyl ester: $D_4^{11.8}$ 0.978. $[\alpha]_D^{11.8} - 71.6^\circ$.

Anhydride: see Methylsuccinic Anhydride.

β -Et ester- α -nitrile: $C_7H_{11}O_2N$. MW, 141. B.p. $105\text{--}6^\circ/14$ mm.

Dinitrile: propylene cyanide, 1:2-dicyanopropane. $C_5H_6N_2$. MW, 94. Prisms. M.p. 12° . B.p. $252\text{--}4^\circ$, $130\text{--}40^\circ/20$ mm.

Diamide: $C_5H_{10}O_2N_2$. MW, 130. Cryst. M.p. 225° . Very sol. hot H_2O . Sol. 50 parts H_2O at 15° . Insol. org. solvents.

Monoanilide: exists in two forms. (i) Needles from AcOEt. M.p. 159° . Very sol. EtOH. 0.09 parts sol. 100 parts H_2O , 0.05 parts sol. 100 parts CHCl_3 . Decomp. on warming with H_2O . (ii) Needles from CHCl_3 . M.p. 123° . Very sol. EtOH, AcOEt. Sol. boiling CHCl_3 . Mod. sol. hot C_6H_6 . 1.6 parts sol. 100 parts CHCl_3 at 16° , 1.2 parts sol. 100 parts H_2O at 15° . Insol. pet. ether. Decomp. on warming with H_2O . Above m.p. \rightarrow anil.

Dianilide: needles from EtOH. M.p. 200° . Very sol. EtOH. Spar. sol. CHCl_3 . Insol. H_2O , C_6H_6 .

Mono-p-toluidide: needles from EtOH. M.p. 164° . Sol. EtOH, Et_2O . Spar. sol. C_6H_6 .

Mono-p-bromoanilide: cryst. from CHCl_3 . M.p. 165° ($158\text{--}158.5^\circ$). Sol. EtOH, Et_2O . Spar. sol. H_2O , C_6H_6 , CHCl_3 .

Mono-1-naphthalide: needles from EtOH. M.p. $160\text{--}1^\circ$.

Mono-2-naphthalide: plates from EtOH.

M.p. 154.5° . Sol. EtOH, Et_2O . Spar. sol. C_6H_6 .

Di-1-naphthalide: needles from EtOH. M.p. $243\text{--}4^\circ$.

Anil: needles from H_2O . M.p. $109\text{--}10^\circ$. Sol. EtOH, C_6H_6 , CHCl_3 , AcOEt. Sol. 40 parts boiling H_2O . Spar. sol. cold H_2O .

p-Tolylimide: needles from ligroin. M.p. $109\text{--}10^\circ$.

Morrell, *J. Chem. Soc.*, 1914, 105, 1736, 2703.

Boettinger, *Chem.-Ztg.*, 1895, 19, 2081.

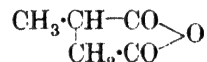
Auwers, Mayer, *Ann.*, 1899, 309, 327.

Bruhl, *J. prakt. Chem.*, 1893, 47, 276.

Bourgoin, *Ann. chim. phys.*, 1877, 12, 419.

v. Braun, Jostes, *Ber.*, 1926, 59, 1444.

Methylsuccinic Anhydride (*Pyrotartaric anhydride*)



$C_5H_6O_3$ MW, 114

d.

Cryst. from EtOH or AcOEt. M.p. $67\text{--}8^\circ$. Sol. EtOH, C_6H_6 , Me_2CO , AcOEt. Spar. sol. pet. ether. $[\alpha]_D + 3.8^\circ$ in C_6H_6 .

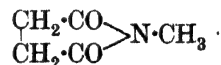
dl.

Cryst. from CHCl_3 . M.p. 37° ($32.5\text{--}34.5^\circ$). B.p. $244\text{--}8^\circ$, $150^\circ/13$ mm. $D_4^{15.5}$ 1.2458, D_{16}^{15} 1.2378, D_{25}^{25} 1.2303. Spar. sol. H_2O . Heat of comb. C_v 462.9 Cal. (solid), 464.7 Cal. (liq.).

Markownikow, *Chem. Zentr.*, 1903, II, 287.

Perkin, *J. Chem. Soc.*, 1888, 53, 564.

N-Methylsuccinimide



$C_5H_7O_2N$ MW, 113

Needles. M.p. 66° . Alc. KOH \rightarrow methylamine.

Labruto, *Gazz. chim. ital.*, 1933, 63, 266.

Methyl sulphate.

See Dimethyl sulphate.

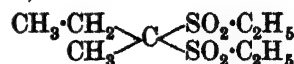
Methyl sulphide.

See Dimethyl sulphide.

Methyl sulphite.

See Dimethyl sulphite.

Methylsulphonal (*Butane 2:2-diethyldisulphone, trional*)



$C_8H_{18}O_4S_2$ MW, 242

Plates from H_2O . M.p. 76° . Sol. 320 parts cold H_2O . Sol. 17.5 parts EtOH, 15.57 parts

Et₂O at 15°. Bitter taste. Powerful hypnotic and narcotic.

Fromm, *Ann.*, 1889, **253**, 150.

Methyl sulphone.

See Dimethyl sulphone.

Methyltartronic Acid.

See Hydroxymethylmalonic Acid.

N-Methyltaurine (2-Methylaminoethane-1-sulphonic acid)



C₃H₉O₃N₃ MW, 139

Prisms. M.p. 241–2°. Sol. H₂O. Insol. EtOH, Et₂O. Does not combine with acids or bases.

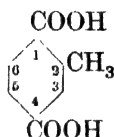
N-Guanyl : prisms + H₂O. M.p. 285° decomp. Spar. sol. cold H₂O. Insol. EtOH, Et₂O.

Dittrich, *J. prakt. Chem.*, 1878, **18**, 70.

I.G., D.R.P., 572,204, (*Chem. Abstracts*, 1933, **27**, 2965).

Josephson, *Biochem. Z.*, 1933, **265**, 448.

Methylterephthalic Acid (Toluene-2 : 5-dicarboxylic acid)



C₉H₈O₄ MW, 180

Powder from hot AcOH. M.p. 325–30°. Sublimes in needles. Mod. sol. boiling AcOH, boiling xylene. Insol. most other solvents.

1-Me ester : C₁₀H₁₀O₄. MW, 194. M.p. 135–6°. $k = 1.56 \times 10^{-4}$ at 25°.

4-Me ester : m.p. 146–7°. $k = 5.5 \times 10^{-4}$ at 25°.

Di-Me ester : C₁₁H₁₂O₄. MW, 208. Cryst. from MeOH. M.p. 73–4°. Very sol. C₆H₆, pet. ether. Spar. sol. cold EtOH.

Bentley, Perkin, *J. Chem. Soc.*, 1897, **71**, 177.

Wegscheider, *Monatsh.*, 1916, **37**, 230.

2-Methyltetracosane.

See Isopentacosane.

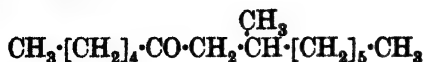
ω-Methyltetracosanol-1.

See Isopentacosyl Alcohol.

Methyl tetradecane-1 : 14-dicarboxylic Acid.

See Methylthapsic Acid.

7-Methyltetradecanone-9



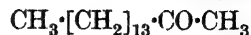
C₁₅H₃₀O

MW, 226

B.p. 143–4°/9 mm. D₄⁰ 0.845.

Bouveault, Locquin, *Bull. soc. chim.*, 1904, **31**, 1159.

Methyl tetradecyl Ketone (Hexadecanone-2)



C₁₆H₃₂O

MW, 240

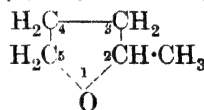
Cryst. M.p. 43°. B.p. 230–1°/100 mm.

Semicarbazone : cryst. from EtOH. M.p. 117–18°.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 1087.

Krafft, *Ber.*, 1882, **15**, 1707.

2-Methyltetrahydrofuran (α-Methyltetramethylene oxide, γ-pentylene oxide)



C₅H₁₀O

MW, 86

B.p. 80°/761 mm., 77–8°/716 mm. D₄⁰ 0.8748, D₁₅²⁰ 0.8534. n_D^{20} 1.40595. Sol. 10 parts cold H₂O. Less sol. hot H₂O. Sol. EtOH, Et₂O, CHCl₃.

Lipp, *Ber.*, 1889, **22**, 2569.

Paul, *Bull. soc. chim.*, 1933, **53**, 417.

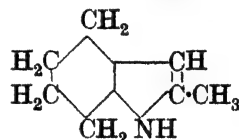
Zelinski, Shuikin, *Chem. Abstracts*, 1934, **28**, 2003.

3-Methyltetrahydrofuran.

B.p. 86–7°. Very sol. EtOH, Et₂O. Sol. H₂O. D₂₀²⁰ 0.8643. n_D^{20} 1.4112.

Harries, *Ann.*, 1911, **383**, 170.

2-Methyl-4 : 5 : 6 : 7-tetrahydroindole (2-Methyl-4 : 5-tetramethylenepyrrole)



C₉H₁₃N

MW, 135

B.p. 222–3°/764 mm., 105°/13 mm., 103–4°/7 mm. D₄⁰ 0.9871, D₄²⁰ 1.0056. Readily darkens. Gives dark red pine splinter reaction.

B₂H₂PtCl₆ : decomp. at 187–8°.

B₂HgCl₂ : m.p. 153–4°.

N-Benzenesulphonyl : m.p. 86–91°.

Picrate : m.p. 141°.

Methiodide : decomp. at 195°.

v. Braun, Bayer, Blessing, *Ber.*, 1924, **57**, 399.

Hadano, Matsuno, *Chem. Abstracts*, 1929, **23**, 1635.

3-Methyl-4 : 5 : 6 : 7-tetrahydroindole 816

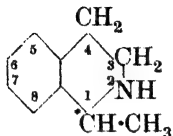
3-Methyl-4 : 5 : 6 : 7-tetrahydroindole.

See Tetrahydroskatole.

N-Methyl-1 : 2 : 3 : 4-tetrahydroisoquinoline.

See Isokairoline.

1-Methyl-1 : 2 : 3 : 4-tetrahydroisoquinoline



$C_{10}H_{13}N$

MW, 147

l..

D_{20}^{20} 1.024.

B, HCl : m.p. 213°.

Ditartrate : m.p. 92°.

dl..

B.p. 233°/745 mm.

Picrate : m.p. 187°.

Leithe, *Monatsh.*, 1929, 53, 956.

3-Methyl-1 : 2 : 3 : 4-tetrahydroisoquinoline.

B.p. 236-7°/751 mm. Sol. H_2O . Reacts alkaline.

Gabriel, Colman, *Ber.*, 1900, 33, 992.

6-Methyl-1 : 2 : 3 : 4-tetrahydroisoquinoline.

B.p. 255-6°/758 mm., 110°/11 mm. D_4^{25} 1.0235.

B, HCl : needles from EtOH. M.p. 195-7°.

N-Nitroso : cryst. from EtOH. M.p. 98°.

Methiodide : cryst. from EtOH-Et₂O. M.p. 144-5°.

Picrate : m.p. 205°.

v. Braun, Blessing, Cahn, *Ber.*, 1924, 57, 911.

7-Methyl-1 : 2 : 3 : 4-tetrahydroisoquinoline.

B.p. 125°/18 mm. D_4^{24} 1.0176.

B, HCl : m.p. 216°.

N-Nitroso : cryst. from EtOH.Aq. M.p. 87°.

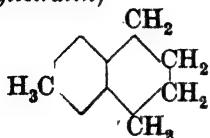
N-Benzenesulphonyl : cryst. M.p. 154°.

Picrate : m.p. 202°.

Methiodide : m.p. 133°.

v. Braun, Wirz, *Ber.*, 1927, 60, 106.

6-Methyl-1 : 2 : 3 : 4-tetrahydronaphthalene (6-Methyltetralin)



$C_{11}H_{14}$

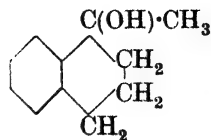
MW, 146

N-Methyl-1 : 2 : 3 : 4-tetrahydro-5-naphthylamine

B.p. 221°, 99-101°/13 mm.

Barbot, *Bull. soc. chim.*, 1930, 47, 1314.

1-Methyl-1 : 2 : 3 : 4-tetrahydro-1-naphthol (1-Methyl-1-tetralol)



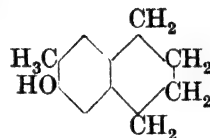
$C_{11}H_{14}O$

MW, 162

Plates from pet. ether. M.p. 88-9°.

Auwers, *Ann.*, 1918, 415, 162.

7-Methyl-1 : 2 : 3 : 4-tetrahydro-6-naphthol (7-Methyl-6-tetralol)



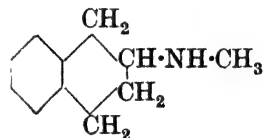
$C_{11}H_{14}O$

MW, 162

Plates from pet. ether. M.p. 88-9°.

Vesely, Štursa, *Chem. Abstracts*, 1934, 28, 5815.

N-Methyl-1 : 2 : 3 : 4-tetrahydro-2-naphthylamine



$C_{11}H_{15}N$

MW, 161

B.p. 118-119.8°/9 mm. Sol. hot H_2O , most org. solvents. D_4^{20} 1.037, D_4^{25} 1.024.

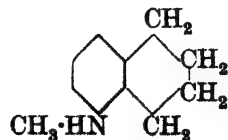
B, HCl : plates and needles from H_2O . M.p. 214°. Sol. EtOH. Spar. sol. cold H_2O .

N-Acetyl : syrup. B.p. 190-210°/17 mm. decomp. Sol. most org. solvents. Spar. sol. H_2O .

B_2, H_2PtCl_6 : plates from H_2O . M.p. 228° decomp.

Waser, *Ber.*, 1916, 49, 1205.

N-Methyl-1 : 2 : 3 : 4-tetrahydro-5-naphthylamine



$C_{11}H_{15}N$

MW, 161

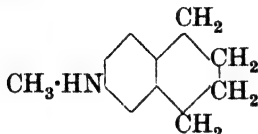
Pale yellow liq. B.p. 150-2°/12 mm.

N-Methyl-1 : 2 : 3 : 4-tetrahydro-6-naphthylamine

Picrate: reddish-yellow cryst. M.p. 174°. Sol. EtOH.

v. Braun, Arkuszewski, Köhler, *Ber.*, 1918, 51, 287.

N-Methyl-1 : 2 : 3 : 4-tetrahydro-6-naphthylamine



$C_{11}H_{15}N$ MW, 161

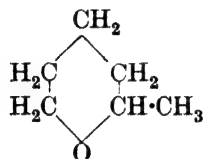
Oil. B.p. 267.5°/210 mm. Sol. most org. solvents. Spar. sol. H_2O .

Smith, *J. Chem. Soc.*, 1904, 85, 735.

N-Methyltetrahydropapaverine.

See Laudanosine.

2-Methyltetrahydropyran (δ -Hexylene oxide)

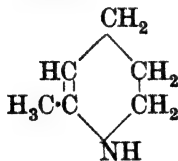


$C_6H_{12}O$ MW, 100

B.p. 104.5–106°/749 mm. Spar. sol. cold H_2O , less sol. hot. $D_4^{21.1}$ 0.8537. n_D 1.4189. Reduces Fehling's but not $NH_3 \cdot AgNO_3$.

Franke, Lieben, *Monatsh.*, 1914, 35, 1433.

6-Methyl-1 : 2 : 3 : 4-tetrahydropyridine (2-Methyl- Δ^2 -piperidine, α -pipecolein)



$C_6H_{11}N$ MW, 97

B.p. 131–2°/716 mm. Sol. H_2O , EtOH, Et_2O . D_4^{20} 0.9133. Turns brown in air.

$B \cdot H \cdot AuCl_4$: yellow needles. M.p. 148° (144–5°) decomp. Sol. EtOH. Spar. sol. H_2O .

$B_2 \cdot H_2 \cdot PtCl_6$: orange-red needles from H_2O . M.p. 193–4° (192°) decomp. Sol. H_2O . Spar. sol. EtOH.

Picrate: yellow needles from H_2O . M.p. 120–1°. Spar. sol. H_2O , EtOH, Et_2O .

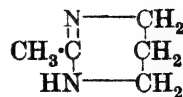
Gabriel, *Ber.*, 1909, 42, 1242.

Lipp, *Ann.*, 1896, 289, 201.

Dict. of Org. Comp.—II.

817 6-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline

2-Methyltetrahydropyrimidine (Ethenyl-trimethylenediamine)



$C_5H_{10}N_2$ MW, 98

Cryst. M.p. 72–4°. B.p. 120–6°/12 mm. Sol. H_2O , EtOH, $CHCl_3$. Less sol. Et_2O , C_6H_6 .

$B \cdot HNO_3$: prisms from H_2O . M.p. 109–10°.

$B_2 \cdot H_2 \cdot PtCl_6$: orange prisms from H_2O . M.p. 206–7°.

Oxalate: needles from H_2O . M.p. 119°.

Hygroscopic.

Picrate: prisms from H_2O . M.p. 152°. Spar. sol. cold H_2O .

Haga, Majima, *Ber.*, 1903, 36, 335.

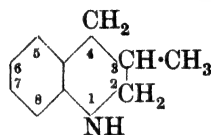
N-Methyltetrahydroquinoline.

See Kairolin.

2-Methyltetrahydroquinoline.

See Tetrahydroquinoline.

3-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline



$C_{10}H_{13}N$ MW, 147

Oil. B.p. 116–18°/10 mm.

$B \cdot HCl$: m.p. 207°.

N-Benzoyl: cryst. from EtOH. M.p. 84°.

Picrate: m.p. 155°.

v. Braun, Gmelin, Schultheiss, *Ber.*, 1923, 56, 1343.

4-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline (1 : 2 : 3 : 4-Tetrahydrolepidine).

B.p. 250–3°/740 mm., 130°/12 mm.

N-Benzoyl: cryst. from EtOH. M.p. 129°.

See previous reference and also

Knorr, Klotz, *Ber.*, 1886, 19, 3300.

5-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline.

$B \cdot HCl$: needles and leaflets. M.p. 238–40°. $K_2Cr_2O_7 + HCl \rightarrow$ purple-violet col. \rightarrow brownish-yellow on warming.

N-Nitroso: prisms from EtOH. M.p. 69–70°.

Gabriel, Thieme, *Ber.*, 1919, 52, 1087.

6-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline (1 : 2 : 3 : 4-Tetrahydro-p-toluquinoline).

Plates. M.p. 38°. B.p. 262–3°/712 mm. Sol. EtOH, C_6H_6 , $CHCl_3$, ligroin. Spar. sol. H_2O .

**7-Methyl-1 : 2 : 3 : 4-tetrahydroquinol-
ine** 818

B,HCl: needles from EtOH-Et₂O. M.p. 189°. Very sol. H₂O, EtOH. Spar. sol. cold CHCl₃. Insol. Et₂O, C₆H₆.

N-Acetyl: b.p. 302-5°/719 mm. Sol. most org. solvents. Spar. sol. H₂O.

N-Benzoyl: cryst. from EtOH. M.p. 78°.

N-Nitroso: yellow cryst. from Et₂O, EtOH or ligroin. M.p. 65°.

Bamberger, Wulz, *Ber.*, 1891, **24**, 2067.

**7-Methyl-1 : 2 : 3 : 4-tetrahydroquinol-
ine (1 : 2 : 3 : 4-Tetrahydro-o-toluquinoline).**

B.p. 264°, 130-2°/12 mm.

B,HCl: cryst. from EtOH. M.p. 175°.

N-Benzoyl: cryst. from EtOH. M.p. 70-2°.

Picrate: m.p. 153-4°.

v. Braun, Gmelin, Schultheiss, *Ber.*, 1923, **56**, 1341.

**8-Methyl-1 : 2 : 3 : 4-tetrahydroquinol-
ine (1 : 2 : 3 : 4-Tetrahydro-o-toluquinoline).**

Oil. B.p. 255-7°/717 mm. Sol. most org. solvents. Spar. sol. H₂O.

B,HCl: plates from EtOH. M.p. 214°. Sol. H₂O, boiling EtOH, hot CHCl₃. Insol. Et₂O, C₆H₆.

N-Acetyl: prisms. M.p. 53-4°. B.p. 297-9°/718 mm.

N-Benzoyl: cryst. from EtOH. M.p. 108°.

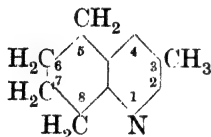
N-Nitroso: prisms from EtOH. M.p. 51°.

B₂H₂PtCl₆: m.p. 212°.

Picrate: m.p. 168°.

Bamberger, Wulz, *Ber.*, 1891, **24**, 2061.

Pincus, *Ber.*, 1892, **25**, 2805.

**3-Methyl-5 : 6 : 7 : 8-tetrahydroquinol-
ine**

C₁₀H₁₃N

MW, 147

B.p. 126-7°/17 mm.

B₂H₂PtCl₆: decomp. at 219°.

Picrate: m.p. 171°.

Methiodide: m.p. 162°.

v. Braun, Gmelin, Schultheiss, *Ber.*, 1923, **56**, 1343.

**4-Methyl-5 : 6 : 7 : 8-tetrahydroquinol-
ine (5 : 6 : 7 : 8-Tetrahydrolepidine).**

B.p. 122°/11 mm. Spar. sol. H₂O.

B,HCl: cryst. from EtOH. M.p. 203-4°.

Picrate: m.p. 170°. Spar. sol. EtOH.

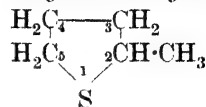
Methiodide: cryst. from EtOH. M.p. 183°.

See previous reference.

1-Methyl-1 : 2 : 3 : 4-tetrazole**8-Methyl-5 : 6 : 7 : 8-tetrahydroquinol-
ine.**

B.p. 220-1°. D₄¹⁸ 1.0052. n_D¹⁸ 1.53643.

Yamaguchi, *Chem. Abstracts*, 1927, **21**, 2696.

**2-Methyltetrahydrothiophene (Tetrahydro-
α-thiotolene, 2-methyltetramethylene sulphide)**

C₅H₁₀S

MW, 102

B.p. 134°, 132.5-132.6°/750 mm. D₄¹⁸ 0.9564. n_D¹⁸ 1.4886.

B,HgCl₂: decomp. about 150°. Spar. sol. usual solvents.

Methiodide: needles from EtOH or Me₂CO. M.p. 155° decomp. Sol. H₂O, EtOH. Spar. sol. Me₂CO. Insol. Et₂O, pet. ether. Sublimes.

Methochloroplatinate: reddish-yellow plates. M.p. 197° decomp. Spar. sol. cold H₂O.

Grishkewitsch-Trochimowski, *J. Russ.*

Phys.-Chem. Soc., 1916, **48**, 919.

v. Braun, *Ber.*, 1910, **43**, 3223.

**3-Methyltetrahydrothiophene (Tetrahydro-
β-thiotolene, 3-methyltetramethylene sulphide).**

B.p. 137.5-138.5°/740 mm. D₄^{18.5} 0.9596. n_D^{18.5} 1.4886. Sol. most org. solvents. Volatile in steam.

B,HgCl₂: cryst. M.p. 82-3°. Spar. sol. H₂O, hot EtOH, Et₂O.

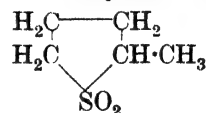
See first reference above.

Methyltetramethylenediamine.

See Methylputrescine.

Methyltetramethylene sulphide.

See Methyltetrahydrothiophene.

2-Methyltetramethylene sulphone

C₅H₁₀O₂S

MW, 134

B.p. 279-80°/758 mm. Sol. H₂O, EtOH, Et₂O. D₄¹⁸ 1.2070. n_D¹⁸ 1.4801.

Grishkewitsch-Trochimowski, *J. Russ.*

Phys.-Chem. Soc., 1916, **48**, 918.

1-Methyl-1 : 2 : 3 : 4-tetrazole

C₂H₄N₄

MW, 84

Prisms. M.p. 36–7°. Sol. H₂O, EtOH. Spar. sol. hot Et₂O. Hot conc. alkalis → methylamine + NH₃ + N.

Olivieri-Mandalà, *Atti accad. Lincei*, 1910, 19, I, 228.

1-Methyl-1 : 2 : 3 : 5-tetrazole



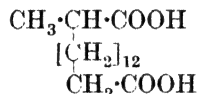
C₂H₄N₄ MW, 84
B.p. 145–7°/759 mm.

Olivieri-Mandalà, Passalacqua, *Gazz. chim. ital.*, 1913, 43, ii, 465.

3-Methyltetrollic Acid.

See Ethylpropionic Acid.

1-Methylthapsic Acid (1-Methyltetradecane-1 : 14-dicarboxylic acid)



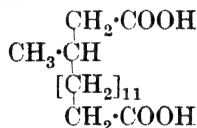
C₁₇H₃₂O₄ MW, 300

Cryst. from AcOEt-pet. ether. M.p. 89–90°. B.p. 223–5°/0.2 mm.

Di-Me ester: C₁₉H₃₆O₄. MW, 328. F.p. 19–21°. B.p. 210–13°/8 mm. D₁₅ 0.9465.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, 10, 188.

2-Methylthapsic Acid (2-Methyltetradecane-1 : 14-dicarboxylic acid)



C₁₇H₃₂O₄ MW, 300

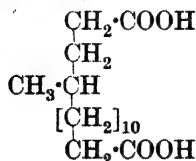
Cryst. from AcOEt. M.p. 77.2–74°. Sol. Et₂O.

Di-Me ester: C₁₉H₃₆O₄. MW, 328. B.p. 198–200°/3.5 mm. D₁₅ 0.946.

Di-Et ester: C₂₁H₄₀O₄. MW, 356. B.p. 209–11°/3.5 mm. D₁₅ 0.931.

See previous reference.

3-Methylthapsic Acid (3-Methyltetradecane-1 : 14-dicarboxylic acid)



C₁₇H₃₂O₄ MW, 300

Cryst. from AcOEt. M.p. 78–78.4°. B.p. 238–40°/1 mm.

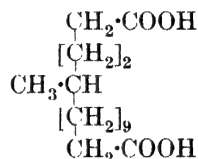
Di-Me ester: C₁₉H₃₆O₄. MW, 328. F.p. 15°. B.p. 203–4°/4 mm. D₁₅ 0.948.

Di-Et ester: C₂₁H₄₀O₄. MW, 356. B.p. 223–5°/8 mm. D₁₅ 0.934.

Dinitrile: C₁₇H₃₀N₂. MW, 262. Plates from EtOH.Aq. M.p. 36.6–36.8°. B.p. 235–45°/8 mm.

See previous reference.

4-Methylthapsic Acid (4-Methyltetradecane-1 : 14-dicarboxylic acid)



C₁₇H₃₂O₄ MW, 300

Cryst. from EtOH.Aq. M.p. 78.8–79°. B.p. 252–3°/3 mm. Sol. usual solvents.

Di-Me ester: C₁₉H₃₆O₄. MW, 328. B.p. 200–202°/3 mm. D₁₅ 0.950.

Di-Et ester: C₂₁H₄₀O₄. MW, 356. B.p. 234–6°/9 mm. D₁₅ 0.931.

See previous reference.

2-Methylthiazole



C₄H₅NS MW, 99

B.p. 127.5–128°. Misc. with cold H₂O.

B₂H₂PtCl₆: plates. M.p. 199°.

B, HgCl₂: m.p. 154.5°.

B, HCl, HgCl₂: m.p. 111–12°.

Picrate: m.p. 145–6°.

Methiodide: sublimes at 298° without melting.

Hantzsch, *Ann.*, 1889, 250, 271.

4-Methylthiazole.

B.p. 133–4°. Misc. with H₂O, EtOH, Et₂O.

B₂H₂PtCl₆: orange-red prisms. M.p. 204° decomp. Sol. H₂O. Spar. sol. EtOH.

B, H AuCl₄: m.p. 184–5° decomp.

B, HgCl₂: m.p. 148°.

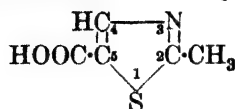
B, HCl, HgCl₂: m.p. 119°.

Picrate: m.p. 174°.

Arapides, *Ann.*, 1888, 249, 24.

Popp, *Ann.*, 1889, 250, 277.

2-Methylthiazole-5-carboxylic Acid

 $C_5H_5O_2NS$

MW, 143

Needles or prisms from H_2O . M.p. $144-5^\circ$. Sol. cold H_2O . Less sol. EtOH. Spar. sol. Et_2O , $CHCl_3$. Insol. C_6H_6 , CS_2 .

Roubleff, *Ann.*, 1890, 259, 271.

4-Methylthiazole-5-carboxylic Acid.

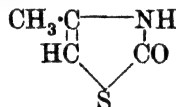
Prisms from H_2O . M.p. 280° decomp. Sol. EtOH. Less sol. hot H_2O , Et_2O . Spar. sol. C_6H_6 , ligroin.

Me ester: $C_6H_7O_2NS$. MW, 157. Prisms from pet. ether. M.p. $74-5^\circ$.

Et ester: $C_7H_9O_2NS$. MW, 171. Prisms. M.p. $27-8^\circ$. B.p. $215-20^\circ$. Very sol. most org. solvents. Volatile in steam. *B, HCl*: needles from EtOH. M.p. 155° decomp.

Tomlinson, *J. Chem. Soc.*, 1935, 1030.

4-Methyl-2-thiazolone (4-Methylrhodim)

 C_4H_5ONS

MW, 115

Exists in two forms.

(α) Needles from H_2O . M.p. $102-3^\circ$.

N-Me: C_5H_7ONS . MW, 129. Prisms or plates from H_2O . M.p. $49-50^\circ$.

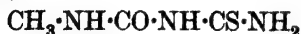
(β) Plates from EtOH. M.p. $183-4^\circ$. Sol. boiling EtOH. Sol. 20 parts boiling, 475 parts cold, H_2O . Sol. alkalis. Spar. sol. Et_2O .

Tcherniac, *J. Chem. Soc.*, 1919, 115, 1075.

Methyl 2-thienyl Ketone.

See 2-Acetothei-one.

ω -Methylthioburet (Thioallophanic acid methylamide)

 $C_3H_7ON_3S$

MW, 133

Needles from H_2O . M.p. 198° (194°) decomp. Sol. hot H_2O . Intense bitter taste.

Hecht, *Ber.*, 1892, 25, 750.Slotta, *Tschesche, Ber.*, 1929, 62, 137.

Methyl thiocyanate

 C_2H_3NS

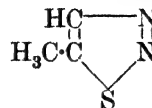
MW, 73

F.p. -51° . B.p. $130.5^\circ/756$ mm. D^{20}_4

1-0765. n^{20}_D 1-0765. Heat of comb. C_7 452-1 Cal.

Schmitz, D.R.P., 264,922, (*Chem. Zentr.*, 1913, II, 1348).

5-Methyl-1 : 2 : 3-thiodiazole

 $C_3H_4N_2S$

MW, 100

B.p. $184^\circ/755$ mm., $88-9^\circ/34$ mm. Sol. EtOH, Et_2O . Sol. 8 parts H_2O at 15° . D^{20}_4 1-2363. Reacts neutral. Readily volatile in steam. Darkens on exposure to light.

B, AuCl_3: yellow needles. M.p. 145° decomp.

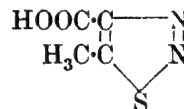
Methiodide: pale yellow needles from EtOH. M.p. $76-7^\circ$. Sol. H_2O .

Methochloroaurate: yellow plates from H_2O . M.p. $136-7^\circ$.

Methochloroplatinate: orange-red needles or prisms from H_2O . M.p. 212° decomp.

Wolff, Kopitzsch, Hall, *Ann.*, 1904, 333, 15.

5-Methyl-1 : 2 : 3-thiodiazole - 4 - carb - oxylic Acid

 $C_4H_4O_2N_2S$

MW, 144

Needles + H_2O from hot H_2O . M.p. $74-5^\circ$, anhyd. 113° . Decomp. at 160° . Sol. hot H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 , $CHCl_3$. Sol. 20 parts H_2O at 20° .

Et ester: $C_6H_8O_2N_2S$. MW, 172. Needles or plates from H_2O . M.p. 35° .

See previous reference.

S - Methylthioglycollic Acid (*Methyl-mercaptoacetic acid, dimethyl sulphide carboxylic acid*)

 $C_3H_6O_2S$

MW, 106

B.p. $130-1^\circ/27$ mm., $107^\circ/9.5$ mm. D^{20}_4 1-223. n^{20}_D 1-495. $k = 1.92 \times 10^{-4}$ at 25° .

Me ester: $C_4H_8O_2S$. MW, 120. B.p. $53-5^\circ/11$ mm.

Anilide: needles from Et_2O -ligroin. M.p. 80° . Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. ligroin. Insol. H_2O .

o-Toluidide: plates from EtOH.Aq. M.p. $65-6^\circ$.

m-Toluidide : needles from EtOH.Aq. M.p. 52-3°.

p-Toluidide : needles from EtOH.Aq. M.p. 102-3°.

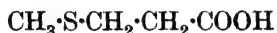
p-Anisidide : needles from EtOH.Aq. M.p. 68°.

p-Phenetidide : needles from EtOH.Aq. M.p. 63°.

Larsson, *Ber.*, 1930, **63**, 1349.

Beckurts, Frerichs, *J. prakt. Chem.*, 1906, **74**, 26, 42.

S-Methylthiohydracrylic Acid (*Methyl 2-carboxyethyl sulphide, 2-methylmercaptopropionic acid*)



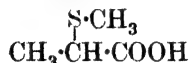
$\text{C}_4\text{H}_8\text{O}_2\text{S}$ MW, 120

Methobromide : needles. M.p. 115° decomp.

Methochloroplatinate : orange-red needles. M.p. 184°.

Carrara, *Gazz. chim. ital.*, 1893, **23**, i, 506.

S-Methylthiolactic Acid (*Methyl 1-carboxyethyl sulphide, 1-methylmercaptopropionic acid*)



$\text{C}_4\text{H}_8\text{O}_2\text{S}$ MW, 120

B.p. 104-104.5°/8 mm. n_D^{20} 1.4843.

Anilide : needles from EtOH. M.p. 126°.

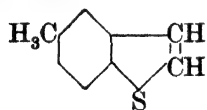
Methobromide : plates. M.p. 84-5° decomp.

Methochloroplatinate : prisms + 2H₂O. M.p. 105-6°. Sol. H₂O.

Carrara, *Gazz. chim. ital.*, 1893, **23**, i, 502.

Mellander, *Chem. Zentr.*, 1935, I, 222.

5-Methylthionaphthene

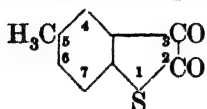


$\text{C}_9\text{H}_8\text{S}$ MW, 148

M.p. 19-22°. B.p. 111-111.5°/12 mm. D_4^{22} 1.111. n_D^{22} 1.607.

Auwers, *Ann.*, 1915, **408**, 282.

5-Methylthionaphthenequinone



$\text{C}_9\text{H}_6\text{O}_2\text{S}$ MW, 178

Red plates from EtOH. M.p. 144°. Sol. CHCl_3 , ligroin. Spar. sol. pet. ether. Insol. H₂O. Sol. alkalis.

2-Oxime : yellow needles or plates from EtOH. M.p. about 188° decomp. Sol. most solvents.

2-Phenylhydrazone : red needles from AcOH.Aq. M.p. 186-5°. Sol. CHCl_3 . Mod. sol. EtOH, C_6H_6 , AcOH. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ red col.

2-Benzoylphenylhydrazone : exists in two forms. (i) Orange-yellow needles from EtOH. M.p. 145°. (ii) Yellow cryst. from C_6H_6 -pet. ether. M.p. 157°.

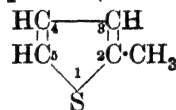
2-p-Dimethylaminoanil : green prisms from EtOH. M.p. 200°.

Pummerer, *Ber.*, 1910, **43**, 1374.

Auwers, *Ann.*, 1911, **381**, 300.

Stollé, *Ber.*, 1914, **47**, 1130; D.R.P., 291,759, (*Chem. Zentr.*, 1916, I, 1103).

2-Methylthiophene (α -Thiotolene)



$\text{C}_5\text{H}_6\text{S}$

MW, 98

Found in coal tar. B.p. 112-14°.

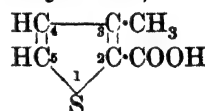
Chrzaszczewska, *Chem. Abstracts*, 1926, **20**, 1079.

3-Methylthiophene (β -Thiotolene).

Found in coal tar. B.p. 114°/738 mm. D_4^{25} 1.0247. n_D 1.5218.

Opolski, *Chem. Zentr.*, 1905, II, 1797.

3-Methylthiophene-2-carboxylic Acid (β -Thiotolene-2-carboxylic acid)



$\text{C}_6\text{H}_6\text{O}_2\text{S}$

MW, 142

Needles from H₂O or 60% EtOH. M.p. 144°. Sol. hot H₂O, EtOH, Et₂O.

Chloride : $\text{C}_6\text{H}_5\text{OClS}$. MW, 160.5. B.p. 218-20°.

Amide : $\text{C}_6\text{H}_7\text{ONS}$. MW, 141. Needles from H₂O. M.p. 122-3°.

Levi, *Ber.*, 1886, **19**, 657.

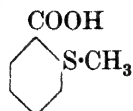
5-Methylthiophene-2-carboxylic Acid (α -Thiotolene-5-carboxylic acid).

Needles from H₂O. M.p. 138-9° (137°). Sublimes in needles at 120°. Sol. hot H₂O, EtOH, Et₂O. Volatile in steam.

Me ester : $\text{C}_7\text{H}_8\text{O}_2\text{S}$. MW, 156. B.p. 102°/16 mm.

See previous reference and also

Rinkes, *Rec. trav. chim.*, 1933, **52**, 546.

S-Methylthiosalicylic Acid (*o*-Methylmercaptobenzoic acid) $C_8H_8O_2S$

MW, 168

Needles from hot H_2O . M.p. 169° (164°). Sol. most org. solvents. Spar. sol. H_2O , ligroin. Spar. volatile in steam.

Me ester: $C_9H_{10}O_2S$. MW, 182. Cryst. from EtOH.Aq. or ligroin. M.p. $66-7^\circ$. Sol. EtOH, C_6H_6 , AcOH.

Nitrile: C_8H_7NS . MW, 149. Yellow needles from MeOH.Aq. M.p. $40-1^\circ$.

Wegscheider, Joachimowitz, *Monatsh.*, 1914, 35, 1054.

Zincke, Siebert, *Ber.*, 1915, 48, 1247.

4-Methylthiosemicarbazide $C_2H_7N_3S$

MW, 105

Cryst. from EtOH. M.p. $137-8^\circ$. Sol. warm H_2O , EtOH. Insol. Et_2O , C_6H_6 , ligroin.

Pulvermacher, *Ber.*, 1894, 27, 622.

Methylthiourea $C_2H_6N_2S$

MW, 90

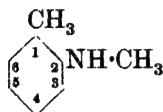
Prisms. M.p. 119° . Sol. H_2O , EtOH. Spar. sol. Et_2O .

B,HI: plates. M.p. below 100° . Very sol. H_2O , EtOH.

Delépine, *Bull. soc. chim.*, 1902, 27, 814.

Methyltoliminazole.

See Dimethylbenziminazole.

N-Methyl-o-toluidine $C_8H_{11}N$

MW, 121

B.p. $207-8^\circ$. D^{15}_4 0.973.

N- β -Bromoethyl: b.p. $118-20^\circ/5$ mm.

N-Acetyl: N-methylacet-o-toluidide.

$C_{10}H_{13}ON$. MW, 163. Cryst. M.p. $55-6^\circ$. B.p. 260° ($250-1^\circ$).

N-Nitroso: b.p. $89-90^\circ/15$ mm.

Picrate: yellowish-red cryst. M.p. 90° .

Monnet, Reverdin, Noelting, *Ber.*, 1878, 11, 2278.

v. Braun, Heider, Müller, *Ber.*, 1918, 51, 279.

N-Methyl-m-toluidine.

B.p. $206-7^\circ$.

N-Acetyl: N-methylacet-m-toluidide. Cryst. M.p. 66° .

N-Nitroso: orange-yellow oil. B.p. $89-90^\circ/1.0$ mm.

See previous references.

N-Methyl-p-toluidine.

B.p. $209-11^\circ/761$ mm. ($206-7^\circ$).

B,HCl: plates from EtOH- Et_2O . M.p. 119.5° . Very sol. H_2O , EtOH. Hygroscopic.

B,HI: pale yellow plates from EtOH- Et_2O . M.p. $134-7^\circ$.

N-Acetyl: N-methylacet-p-toluidide. Plates from Et_2O -EtOH. M.p. 83° . B.p. 283° . Sol. ligroin.

N-Nitroso: cryst. M.p. 52° .

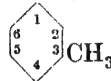
Picrate: golden needles from C_6H_6 . M.p. $130-2^\circ$ decomp.

N-Picryl: red prisms. M.p. $144-5^\circ$.

Thomsen, *Ber.*, 1877, 10, 1583.

Decker, Becker, *Ann.*, 1913, 395, 370.

See also previous references.

Methyl-m-tolylcarbinol (α -Hydroxy-m-ethyltoluene, 1-m-tolyethyl alcohol) $C_9H_{12}O$

MW, 136

Oil. B.p. $108.9-109.4^\circ/12$ mm. $D^{15.2}_4$ 0.9974. $n^{15.35}_D$ 1.526.

Auwers, *Ann.*, 1915, 408, 242.

Methyl-p-tolylcarbinol (α -Hydroxy-p-ethyltoluene, 1-p-tolyethyl alcohol).

Thick oil. B.p. $219^\circ/756$ mm., $120^\circ/19$ mm. $D^{15.5}_4$ 0.9668.

Klages, Keil, *Ber.*, 1903, 36, 1635.

N-Methyl-tolylenediamine.

See under Tolylenediamine.

Methyl tolyl Ether.

See under Cresol.

Methyl o-tolyl Ketone (2-Methylacetophenone, o-acetotoluene) $C_9H_{10}O$

MW, 134

B.p. $214^\circ/761$ mm., $108^\circ/30$ mm., $79^\circ/5$ mm. D^{15}_4 1.0201. $n^{19.7}_D$ 1.535.

Semicarbazone: cryst. from EtOH. M.p. 203° (192°).

2:4-*Dinitrophenylhydrazones*: yellow cryst. from EtOH. M.p. 159°.

Auwers, *Ann.*, 1915, 408, 242.

Eijkman, Bergema, Henrard, *Chem. Zentr.*, 1905, I, 817.

Methyl *m*-tolyl Ketone (3-*Methylacetophenone*, *m*-acetotoluene).

B.p. 220°/760 mm., 109°/12 mm. D_4^{20} 1.0165, $D_4^{15.6}$ 1.0106. n_D^{20} 1.533.

Oxime: cryst. from EtOH.Aq. M.p. 54–6°.

Semicarbazone: cryst. from EtOH. M.p. 197–8°.

2:4-*Dinitrophenylhydrazones*: orange-red cryst. from AcOH. M.p. 207°.

Mauthner, *J. prakt. Chem.*, 1922, 103, 394.

See also first reference above.

Methyl *p*-tolyl Ketone (4-*Methylacetophenone*, *p*-acetotoluene).

Needles. M.p. 28°. B.p. 225°/736 mm., 112.5°/11 mm., 93.5°/7 mm. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. D_4^{20} 1.0150, D_4^{20} 1.0051. $n_D^{17.4}$ 1.5353, n_D^{20} 1.5335.

Oxime: cryst. from pet. ether. M.p. 88°. Sol. EtOH. Spar. sol. pet. ether. Insol. H₂O.

Semicarbazone: needles or plates from EtOH. M.p. 205°.

Hydrazones: yellow cryst. from EtOH. M.p. 131–2°. Sol. EtOH, Et₂O.

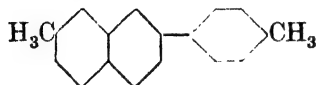
Azine: cryst. M.p. 136°.

Phenylhydrazones: cryst. from EtOH. M.p. 121°.

Noller, Adams, *J. Am. Chem. Soc.*, 1924, 46, 1893.

Groggins, Nagel, U.S.P., 1,966,797, (*Chem. Abstracts*, 1934, 28, 5469).

7-Methyl-2-*p*-tolylⁿaphthalene



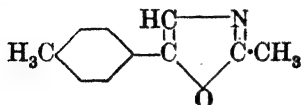
C₁₈H₁₆

MW, 232

Plates from pet. ether. M.p. 140–1°. Sol. C₆H₆, AcOH, hot ligroin. Mod. sol. hot EtOH, Et₂O, Me₂CO. Spar. sol. MeOH, pet. ether.

Auwers, Keil, *Ber.*, 1903, 36, 1873, 3909.

2-Methyl-5-*p*-tolylloxazole



C₁₁H₁₁ON

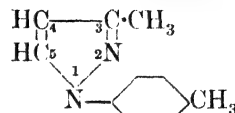
MW, 173

Leaflets from CS₂-pet. ether. M.p. 58–9°. Very sol. usual org. solvents. Spar. sol. hot H₂O.

B₂H₂PtCl₆: red prisms + 2H₂O. M.p. 195° decomp.

Rüdenburg, *Ber.*, 1913, 46, 3562.

3-Methyl-1-*p*-tolylpyrazole



C₁₁H₁₂N₂

MW, 172

Plates. M.p. 50°.

Michaelis, Sudendorf, *Ber.*, 1900, 33, 2618.

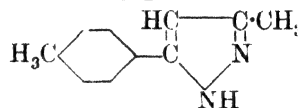
5-Methyl-1-*p*-tolylpyrazole.

Oil. B.p. 270–8°.

B₂H₂PtCl₆: cryst. ppt. from HCl. M.p. 214° decomp.

Bülow, Schlesinger, *Ber.*, 1900, 33, 3365.

3-Methyl-5-*p*-tolylpyrazole



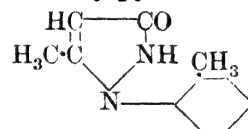
C₁₁H₁₂N₂

MW, 172

Needles from EtOH.Aq. M.p. 125°.

Basu, *J. Indian Chem. Soc.*, 1931, 8, 122.

5-Methyl-1-*o*-tolylpyrazolone-3



C₁₁H₁₂ON₂

MW, 188

Prisms. M.p. 169°. Sol. hot EtOH, CHCl₃. Spar. sol. H₂O, Et₂O, pet. ether. Sol. acids, alkalis.

B.HCl: prisms. M.p. 190°.

N-Benzoyl: prisms from EtOH. M.p. 72°. Sol. Et₂O, pet. ether.

N-Benzenesulphonyl: needles from EtOH. M.p. 80°.

Anisylidene deriv.: powder. M.p. 295°.

Michaelis, Behrens, *Ann.*, 1905, 338, 312.

5-Methyl-1-*p*-tolylpyrazolone-3.

Needles. M.p. 196°. Sol. hot EtOH, CHCl₃. Spar. sol. H₂O, Et₂O. pet ether. Sol. HCl, alkalis.

B.HCl: plates. M.p. 206°.

Benzoyl: needles from EtOH. M.p. 47°.

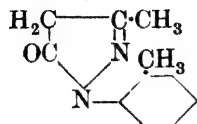
Benzenesulphonyl: needles from EtOH. M.p. 47°.

Benzylidene: cryst. M.p. 278°.

Anisylidene: m.p. 270°.

See previous reference.

3-Methyl-1-o-tolylpyrazolone-5



$C_{11}H_{12}ON_2$

Cryst. M.p. 183°.

Knorr, *Ber.*, 1884, 17, 549.

3-Methyl-1-p-tolylpyrazolone-5.

Cryst. M.p. 140°.

See previous reference.

Methyl p-tolyl sulphide (p-Thiocresol methyl ether)



$C_8H_{10}S$

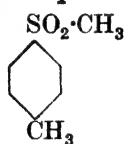
MW, 138

Oil. B.p. 209°/747 mm., 104-5°/20 mm.
 D_4^{16} 1.0302. n_D^{16} 1.57537.

Kehrmann, Sava, *Ber.*, 1912, 45, 2897.

Gilman, Beaber, *J. Am. Chem. Soc.*, 1925, 47, 1449.

Methyl p-tolyl sulphone



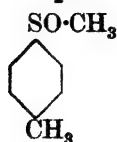
$C_8H_{10}O_2S$

MW, 170

Plates from C_6H_6 -pet. ether. M.p. 89° (86-7°). Sol. Me_2CO , C_6H_6 , $CHCl_3$, AcOH. Less sol. Et_2O , pet. ether.

Zincke, Frohneberg, *Ber.*, 1910, 43, 848.

Methyl p-tolyl sulphoxide



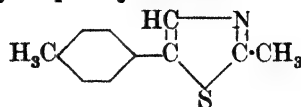
$C_8H_{10}OS$

MW, 154

Cryst. M.p. 50-4°. B.p. 168°/38 mm. Easily decomp.

See previous reference.

2-Methyl-5-p-tolylthiazole



$C_{11}H_{11}NS$

MW, 189

Plates from pet. ether. M.p. 81-2°.

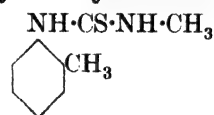
B, HCl : needles + H_2O . M.p. 195-6°.

B, H_2AuCl_4 : golden-yellow needles from AcOH. M.p. 129-31°.

B_2, H_2PtCl_6 : orange-yellow needles + $2H_2O$ from H_2O . M.p. 202-3° decomp.

Rüdenburg, *Ber.*, 1913, 46, 3563.

sym.-Methyl-o-tolylthiourea



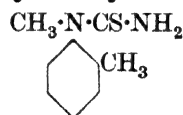
$C_9H_{12}N_2S$

MW, 180

Prisms from EtOH + 33% methylamine. M.p. 161° (152-3°). Sol. hot EtOH. Mod. sol. boiling H_2O .

Hunter, Styles, *J. Chem. Soc.*, 1928, 3024.

unsym.-Methyl-o-tolylthiourea



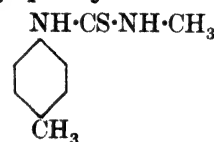
$C_9H_{12}N_2S$

MW, 180

Needles from MeOH. M.p. 107-8°.

Hunter, Styles, *J. Chem. Soc.*, 1928, 3025.

sym.-Methyl-p-tolylthiourea



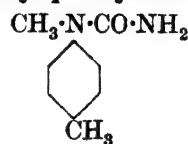
$C_9H_{12}N_2S$

MW, 180

Prisms from EtOH. M.p. 125-6°.

Dixon, *J. Chem. Soc.*, 1889, 55, 620.

unsym.-Methyl-p-tolylurea



$C_9H_{12}ON_2$

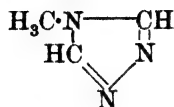
MW, 164

Cryst. from C_6H_6 -ligroin. M.p. 103°.

Thate, *Rec. trav. chim.*, 1929, 48, 116.

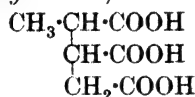
Boehringer, Soehne, D.R.P., 367,611, (Chem. Abstracts, 1924, 18, 990).

4-Methyl-1 : 2 : 4-triazole

 $\text{C}_3\text{H}_5\text{N}_3$

MW, 83

Cryst. from EtOH. M.p. 90°.

 B.HCl : cryst. from EtOH-Et₂O. M.p. 186°. B.HgCl_2 : m.p. 175°.Freund, Schwarz, *Ber.*, 1896, **29**, 2489.1-Methyltricarballylic Acid (*Butane-1 : 2 : 3-tricarboxylic acid*) $\text{C}_7\text{H}_{10}\text{O}_6$

MW, 190

Cis:

Prisms from H₂O, needles from AcOEt. M.p. 139–42° (134°). Very sol. H₂O, EtOH, Et₂O, AcOEt. Insol. C₆H₆. $k = 4.8 \times 10^{-4}$ at 25°.

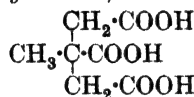
Trans:

Prisms from H₂O. M.p. 185–6° (180°). Sol. H₂O, EtOH, Me₂CO, AcOEt. Spar. sol. Et₂O. Insol. C₆H₆, CHCl₃, ligroin. $k = 3.2 \times 10^{-4}$ at 25°.

Tri-Et ester: C₁₃H₂₂O₆. MW, 274. B.p. 180–1°/24 mm.

Hope, *J. Chem. Soc.*, 1912, **101**, 901.

Auwers, Köbner, v. Meyenburg, *Ber.*, 1891, **24**, 2891.

2-Methyltricarballylic Acid (*2-Methylpropane-1 : 2 : 3-tricarboxylic acid*, *isobutane-1 : 2 : 3-tricarboxylic acid*) $\text{C}_7\text{H}_{10}\text{O}_6$

MW, 190

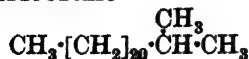
Cryst. from HCl. M.p. 165–6°. Sol. Me₂CO, AcOH, AcOEt, H₂COOH. Insol. C₆H₆, CHCl₃, pet. ether.

Tri-Et ester: C₁₃H₂₂O₆. MW, 274. B.p. 163–4°/15 mm.

1 : 2-Anhydride: C₇H₈O₅. MW, 172. Prisms from AcOEt. M.p. 139–40°. B.p. 220–3°/15 mm. Sol. Et₂O, AcOEt. Spar. sol. CHCl₃. Insol. C₆H₆, pet. ether.

See previous references.

2-Methyltricosane

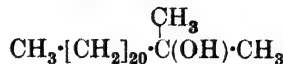
 $\text{C}_{24}\text{H}_{50}$

MW, 338

Cryst. M.p. 42°.

Landa, Riedl, *Chem. Zentr.*, 1931, **1**, 2454.

2-Methyltricosanol-2

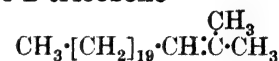
 $\text{C}_{24}\text{H}_{50}\text{O}$

MW, 354

Cryst. from Et₂O. M.p. 63°.

See previous reference.

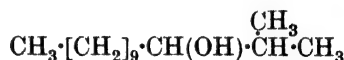
2-Methyl-2-tricosene

 $\text{C}_{24}\text{H}_{48}$

MW, 336

Cryst. M.p. 41–5°.

See previous reference.

2-Methyltridecanol-3 (*Isopropyl-n-decylcarbinol*) $\text{C}_{14}\text{H}_{30}\text{O}$

MW, 214

*d*l-.

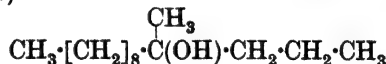
Needles. M.p. 20°. B.p. 164°/29 mm. D_4^{20} 0.8390. n_D^{20} 1.4460. $[\alpha]_D + 16.15^\circ$, $+ 18.34^\circ$ in EtOH.

Acid phthalate: cryst. from pet. ether. M.p. 65–6°. $[\alpha]_D + 16.8^\circ$ in EtOH, $+ 14.2^\circ$ in CHCl₃.

dl-.
B.p. 274°.

Acid phthalate: cryst. from pet. ether. M.p. 58–9°.

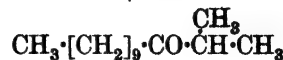
Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 636.

4-Methyltridecanol-4 (*Methylpropylnonylcarbinol*) $\text{C}_{14}\text{H}_{30}\text{O}$

MW, 214

B.p. 140–2°/13 mm. D^{15} 0.8406.

Thoms, Ambrus, *Arch. Pharm.*, 1925, **263**, 263.

2-Methyltridecanone-3 (*Isopropyl decyl ketone*) $\text{C}_{14}\text{H}_{28}\text{O}$

MW, 212

Plates. M.p. 47°. B.p. 266–8°/745 mm.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 629.

12-Methyltridecyl Alcohol (*Isomyristyl alcohol*)

$(\text{CH}_3)_2\text{CH}\cdot[\text{CH}_2]_{10}\cdot\text{CH}_2\text{OH}$
 $\text{C}_{14}\text{H}_{30}\text{O}$ MW, 214
 M.p. 10–11°. B.p. 145–50°/6 mm. D_{20}^{20} 0.8429. n_D^{20} 1.4437.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, **55**, 3372.

12-Methyltridecyl bromide (*Isomyristyl bromide*, 13-bromo-2-methyltridecane)

$(\text{CH}_3)_2\text{CH}\cdot[\text{CH}_2]_{10}\cdot\text{CH}_2\text{Br}$
 $\text{C}_{14}\text{H}_{29}\text{Br}$ MW, 277
 B.p. 120–2°/3 mm. D_4^{20} 1.0241. n_D^{20} 1.4598.

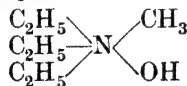
See previous reference.

Methyl tridecyl Ketone (*Pentadecanone-2*)

$\text{CH}_3\cdot[\text{CH}_2]_{12}\cdot\text{CO}\cdot\text{CH}_3$
 $\text{C}_{15}\text{H}_{30}\text{O}$ MW, 226
 Cryst. M.p. 39°. B.p. 294°. D^{39} 0.8182.
 Krafft, *Ber.*, 1879, **12**, 1669.
 Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108r.

11-Methyltridecylic Acid.

See Isomyristic Acid.

Methyltriethylammonium hydroxide

$\text{C}_7\text{H}_{19}\text{ON}$ MW, 133

Cryst. Reacts strongly alkaline. Bitter taste. Unstable. Dist. \rightarrow methyldiethylamine + ethylene + H_2O .

Chloride: cryst. from EtOH.

Bromide: cryst. from EtOH.

Iodide: needles from EtOH– Et_2O . M.p. above 230°.

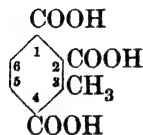
Iodide + I_2 : bluish-violet plates. M.p. 62°.

Iodide + I_4 : green plates. M.p. 16°.

Iodide + I_6 : brownish-violet plates. M.p. 42°.

Hofmann, *Ann.*, 1851, **78**, 277.

Geuther, *Ann.*, 1887, **240**, 71.

3-Methyltrimellitic Acid (*Toluene-2 : 3 : 6-tricarboxylic acid*)

$\text{C}_{10}\text{H}_8\text{O}_6$ MW, 224

Needles from hot H_2O . M.p. about 315°. Sublimes. Dist. with $\text{CaO} \rightarrow$ toluene.

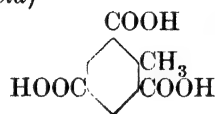
Doebner, *Ann.*, 1900, **311**, 142.

5-Methyltrimellitic Acid (*Toluene-2 : 4 : 5-tricarboxylic acid*)

Cryst. from HNO_3 . M.p. 223° (212–16°) decomp. Very sol. H_2O , MeOH, Me_2CO , AcOH. Spar. sol. Et_2O , C_6H_6 , CHCl_3 . Insol. pet. ether.

Späth, Wessely, Kornfeld, *Ber.*, 1932, **65**, 1548.

Borsche, Niemann, *Ann.*, 1932, **499**, 72.

2-Methyltrimesic Acid (*Toluene-2 : 4 : 6-tricarboxylic acid*)

$\text{C}_{10}\text{H}_8\text{O}_6$ MW, 224

Needles from H_2O . Decomp. at 300°. Sol. hot H_2O , AcOH, AcOEt. Spar. sol. C_6H_6 , pet. ether.

Tri-Me ester: $\text{C}_{13}\text{H}_{14}\text{O}_6$. MW, 266. Needles from MeOH or pet. ether. M.p. 107°.

Tri-Et ester: $\text{C}_{16}\text{H}_{20}\text{O}_6$. MW, 308. Needles from pet. ether. M.p. 48°. B.p. 210–20°/14 mm.

Simonsen, *J. Chem. Soc.*, 1910, **97**, 1913.

2-Methyltriphenylamine.

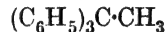
See Diphenyl-*o*-toluidine.

Methyltriphenylcarbinol.

See Diphenyltolylcarbinol.

Methyltriphenylguanidine.

See Diphenyltolylguanidine.

 α -Methyltriphenylmethane (1 : 1 : 1-*Triphenylethane*)

$\text{C}_{20}\text{H}_{18}$ MW, 258

Needles from EtOH. M.p. 95°. Sol. C_6H_6 , Et_2O . Spar. sol. cold EtOH, AcOH. Stable to ox. agents.

Gomberg, Cone, *Ber.*, 1906, **39**, 1466.

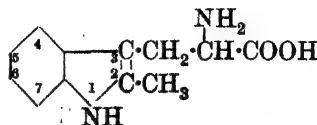
Kuntze-Fechner, *Ber.*, 1903, **36**, 473.

Methyltriphenylmethane.

See Diphenyltolylmethane.

N-Methyltryptamine.

See 3-[ω -Methylaminoethyl]-indole.

2-Methyltryptophane

$\text{C}_{12}\text{H}_{14}\text{O}_2\text{N}_2$

MW, 218

Prisms + MeOH from MeOH-Et₂O. M.p. 263–73°. Sol. H₂O. Spar. sol. EtOH. Sweet taste.

Picrate: orange-red plates from MeOH-pet. ether. M.p. 173°.

Barger, Ewins, *Biochem. J.*, 1917, **11**, 58.

5-Methyltryptophane.

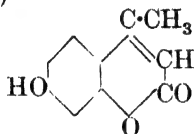
Plates from H₂O-EtOH. M.p. 259–63°. Sol. H₂O. Bitter taste.

Robson, *J. Biol. Chem.*, 1924, **62**, 512.

N-Methyltyrosine.

See Surinamine.

4-Methylumbelliferone (7-Hydroxy-4-methylcoumarin)



C₁₀H₈O₃ MW, 176

Needles from EtOH. M.p. 185–6°. Sol. EtOH, AcOH. Spar. sol. hot H₂O, Et₂O, CHCl₃. Sol. alkalis, NH₃. Spar. sol. carbonates. Conc. H₂SO₄ → blue fluor. Reduces warm NH₃.AgNO₃. Used as fluorescence indicator.

Me ether: C₁₁H₁₀O₃. MW, 190. Needles from EtOH. M.p. 159°. Sol. hot AcOH. Spar. sol. EtOH, Et₂O, CHCl₃. Insol. H₂O. Conc. H₂SO₄ → intense blue fluor.

Acetyl: needles from EtOH or Et₂O. M.p. 150°. Sol. EtOH. Spar. sol. H₂O.

Carbethoxyl: m.p. 99–100°.

Benzoyl: needles from EtOH. M.p. 159–60°. Spar. sol. EtOH. Insol. H₂O.

o-Chlorobenzoyl: m.p. 155–6°.

m-Nitrobenzoyl: m.p. 210–11°.

p-Nitrobenzoyl: m.p. 143°.

Phenylacetyl: m.p. 102–3°.

Cinnamoyl: m.p. 154°.

2-Naphthoyl: m.p. 179–80°.

Phenylurethane: m.p. 155–6°.

Picrate: yellow needles. M.p. 108°.

v. Pechmann, Duisberg, *Ber.*, 1883, **16**, 2122.

Wittenberg, *J. prakt. Chem.*, 1881, **24**, 125.

Barger, Eaton, *J. Chem. Soc.*, 1924, **125**, 2410.

5-Methylumbelliferone.

See Homoumbelliferone.

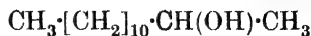
2-Methylundecanol-5.

See Isoamylhexylcarbinol.

6-Methylundecanol-6.

See Methyldiamylcarbinol.

Methylundecylcarbinol (Tridecanol-2)



C₁₃H₂₈O MW, 200
d-.

M.p. 30°. B.p. 265°, 156–7°/11 mm. D₄²⁰ 0.8215. [α]_D²⁰ + 7.22° (supercooled), + 8.74° in C₆H₆, + 7.37° in EtOH.

Acetyl: b.p. 162°/20 mm. D₄^{18.5} 0.8585. n_D²⁰ 1.4314. [α]_D²⁰ + 4.63°.

Lauryl: b.p. 204°/3 mm. D₄¹⁰ 0.8616. n_D²⁰ 1.4463. [α]_D²⁰ + 5.87°.

Acid phthalate: m.p. 26°. [α]_D + 35.5° in CHCl₃, + 41.1° in EtOH. *Brucine salt*: m.p. 120–2°. [α]_D – 5.7° in EtOH. *Strychnine salt*: m.p. 142–3°. [α]_D – 18.7° in CHCl₃.

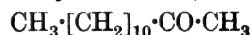
dl-.

B.p. 151°/11 mm.

Acid phthalate: cryst. from pet. ether. M.p. 58–9°.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 58.

Methyl undecyl Ketone (Tridecanone-2)



C₁₃H₂₆O MW, 198

Cryst. M.p. 29°. B.p. 260–5°, 195.5°/110 mm., 160°/16 mm. D₂₀ 0.8229. Used as flavouring essence.

Oxime: cryst. from Et₂O-pet. ether. M.p. 56–7°. Sol. EtOH, Et₂O, CHCl₃. Mod. sol. Et₂O. Insol. pet. ether.

Semicarbazone: cryst. from EtOH. M.p. 126°.

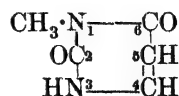
2:4-Dinitrophenylhydrazones: orange-yellow cryst. from EtOH. M.p. 69°.

Guerin, *Bull. soc. chim.*, 1903, **29**, 1128.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108r.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **55**, 57.

1-Methyluracil



C₅H₆O₂N₂ MW 126

Prisms from EtOH.Aq. M.p. 174–5°.

Johnson, Heyl, *Am. Chem. J.*, 1907, **37**, 628.

Levene, Tipson, *J. Biol. Chem.*, 1934, **104**, 385.

3-Methyluracil.

Prisms from H_2O . M.p. 232° . Sol. alk. hydroxides, pptd. by dil. HCl .

Wheeler, Johnson, *Am. Chem. J.*, 1909, **42**, 30.

4-Methyluracil.

Needles from EtOH . M.p. about $270-80^\circ$ decomp. 0.74 parts sol. 100 parts H_2O at 22° . Sol. alkalis. Spar. sol. EtOH . Insol. Et_2O .

Behrend, Roosen, *Ann.*, 1889, **251**, 238.

Thiele, Bihan, *Ann.*, 1898, **302**, 308.

5-Methyluracil.

See Thymine.

Methyluracil-4-carboxylic Acid.

See Methylorotic Acid.

Methylurea (Methylcarbamic amide)

$\text{C}_2\text{H}_6\text{ON}_2$

MW, 74

Prisms from H_2O or EtOH . M.p. 102° . Very sol. H_2O , EtOH . Insol. Et_2O , C_6H_6 , CS_2 , ligroin. Reacts neutral.

B, HCl : m.p. about $85-7^\circ$.

B, HNO_3 : cryst. M.p. $128-32^\circ$.

Acetyl: see sym.-Methylacetylurea.

Dichloroacetyl: cryst. from Et_2O -ligroin. M.p. about $29-30^\circ$.

Cyanoacetyl: cryst. M.p. $41-41.5^\circ$.

Dicyanoacetyl: plates. M.p. $54-56.5^\circ$. Very sol. org. solvents.

N-Nitroso deriv.: plates from Et_2O . M.p. $123-4^\circ$. decomp. Sol. EtOH , Et_2O , Me_2CO . Mod. sol. C_6H_6 , CHCl_3 . Insol. cold H_2O .

Baum, *Ber.*, 1908, **41**, 528.

Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, **51**, 1797.

Werner, *J. Chem. Soc.*, 1919, **115**, 1096.

Methylurethane (Ethyl methylaminoformate, ethyl methylcarbamate)



$\text{C}_4\text{H}_9\text{O}_2\text{N}$

MW, 103

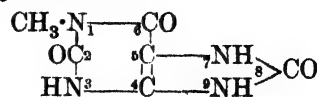
B.p. 170° , $80^\circ/15$ mm. D_4^{20} 1.035. n_D^{20} 1.421. Narcotic.

N-Nitroso: yellowish-red liq. B.p. $65-65.5^\circ/13$ mm. Misc. completely with EtOH , Et_2O , C_6H_6 . Spar. sol. H_2O . D_4^{20} 1.1402. n_D^{20} 1.43905.

Hartman, Brethen, *Organic Syntheses*, 1932, **XII**, 38.

Maugin, *Ann. chim. phys.*, 1911, **22**, 322.

v. Pechmann, *Ber.*, 1895, **28**, 856.

1-Methyluric Acid

$\text{C}_6\text{H}_6\text{O}_3\text{N}_4$

MW, 182

Needles. M.p. about 400° . Sol. 2050 parts boiling H_2O . $k = 4.7 \times 10^{-5}$ at 25° .

Prüsse, *Ann.*, 1925, **441**, 211.

3-Methyluric Acid.

Prisms + H_2O from H_2O . Does not melt below 350° . Loses H_2O of cryst. at 150° . Sol. 527 parts boiling H_2O . $k = 4.5 \times 10^{-5}$ at 25° .

v. Loeben, *Ann.*, 1897, **298**, 184.

Biltz, Heyn, *Ann.*, 1917, **413**, 108.

7-Methyluric Acid.

Plates from hot H_2O . Decomp. at $370-80^\circ$. Very sol. NaOH . Sol. about 80 parts boiling H_2O . $k = 1.15 \times 10^{-4}$ at 25° .

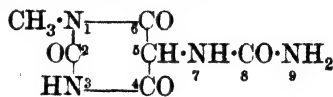
Biltz, Marwitzky, Heyn, *Ann.*, 1921, **423**, 125.

Boehringer, Soehne, D.R.P., 105,345, (*Chem. Zentr.*, 1900, I, 270).

9-Methyluric Acid.

Plates from H_2O . M.p. about $380-400^\circ$ decomp. Sol. 1830 parts boiling H_2O . $k = 2.20 \times 10^{-4}$ at 25° .

Biltz, Heyn, *Ann.*, 1917, **413**, 96.

1-Methyl- ψ -uric Acid

$\text{C}_6\text{H}_8\text{O}_4\text{N}_4$

MW, 186

Needles from H_2O . M.p. 220° decomp. Sol. 35 parts boiling H_2O .

Fischer, Clemm, *Ber.*, 1897, **30**, 3091.

7-Methyl- ψ -uric Acid.

Cryst. + H_2O from H_2O . Sol. 23 parts boiling H_2O . Sol. K_2CO_3 -Aq.

Fischer, *Ber.*, 1897, **30**, 561.

9-Methyl- ψ -uric Acid.

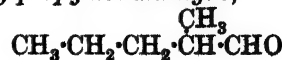
Needles or prisms + H_2O from H_2O . M.p. $260-1^\circ$ decomp. Mod. sol. H_2O .

Biltz, Heyn, *Ann.*, 1917, **413**, 94.

Methyluvinic Acid.

See 2-Methyl-5-ethyl- β -furoic Acid.

1-Methylvaleraldehyde (2-Methylpentanal-1, methylpropylacetaldehyde)



$\text{C}_6\text{H}_{12}\text{O}$

MW, 100

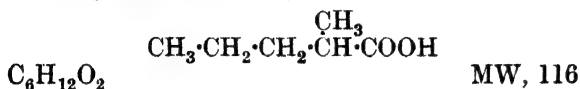
B.p. 116°. Forms cryst. bisulphite comp.
2:4-Dinitrophenylhydrazones: cryst. from
AcOH. M.p. 103°.

Lieben, Zeisel, *Monatsh.*, 1883, 4, 22.
Skita, *Ber.*, 1915, 48, 1491.

3-Methylvaleraldehyde.

See Isocaproic Aldehyde.

1-Methylvaleric Acid (*Methylpropylacetic acid*, *n-pentane-2-carboxylic acid*)



d.

B.p. 96°/15 mm. D_4^{25} 0.908. n_D^{25} 1.4112.
[α] $_D^{25}$ + 5.58° in Et₂O.

Et ester: C₈H₁₆O₂. MW, 144. B.p. 78–80°/4 mm. [α] $_D^{25}$ + 5.67° in Et₂O.

Chloride: C₆H₁₁OCl. MW, 134.5. B.p. 45–8°/15 mm. [α] $_D^{25}$ + 4.06°.

Amide: C₆H₁₃ON. MW, 115. Cryst. from H₂O. M.p. 78°. [α] $_D^{25}$ + 5.79° in 75% EtOH.

l.

B.p. 96°/15 mm. D_4^{25} 0.920. n_D^{25} 1.4117. [α] $_D^{25}$ – 7.08° in Et₂O.

Et ester: b.p. 78–80°/4 mm. [α] $_D^{25}$ – 7.91°.

Amide: m.p. 78°. [α] $_D^{25}$ – 5.79° in 75% EtOH.

Nitrile: C₆H₁₁N. MW, 97. B.p. 30–2°/2 mm. [α] $_D^{25}$ – 13.77°.

dl.

B.p. 192.0–193.6°/748 mm. D_4^0 0.9405, D_4^{20} 0.9230. n_D 1.4136.

Et ester: b.p. 153°/751.5 mm. D^0 0.8816, D_0^{18} 0.8670.

p-Iodophenacyl ester: m.p. 66°.

p-Phenylphenacyl ester: m.p. 46°.

Chloride: b.p. 140.0–140.8°/745 mm. D_4^0 0.9979, D_4^{20} 0.9781.

Amide: m.p. 79.6° (85°).

Anilide: m.p. 95.2°.

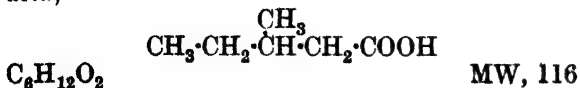
p-Toluidide: m.p. 80.5°.

Levene, Mikeska, *J. Biol. Chem.*, 1929, 84, 571.

Hommelen, *Bull. soc. chim. Belg.*, 1933, 42, 243.

Levene, Marker, *J. Biol. Chem.*, 1932, 98, 1.

2-Methylvaleric Acid (*2-Methyl-2-ethylpropionic acid*, *2-ethylbutyric acid*, *sec.-n-butylacetic acid*)



d.

B.p. 197.4–198°. D^{15} 0.930. [α] $_D^{25}$ + 4.01°.

Me ester: C₇H₁₄O₂. MW, 130. B.p. 141–2°. $D^{15.5}$ 0.8886.

Et ester: C₈H₁₆O₂. MW, 144. B.p. 68°/25 mm. D_4^{25} 0.864. n_D^{25} 1.4062. [α] $_D^{25}$ + 3.26°.

Chloride: C₆H₁₁OCl. MW, 134.5. B.p. 81°/100 mm. D_4^{20} 0.957. n_D^{25} 1.4245. [α] $_D^{20}$ + 5.43°.

Amide: C₆H₁₃ON. MW, 115. Cryst. from EtOH. M.p. 124°. Sol. EtOH, Et₂O. [α] $_D^{25}$ + 2.00° in 75% EtOH.

Nitrile: C₆H₁₁N. MW, 97. B.p. 151.4–152.6°/743 mm., 87°/100 mm. D_4^{25} 0.811. n_D^{25} 1.4070. [α] $_D^{25}$ + 3.72°.

l.

B.p. 110°/150 mm. D_4^{26} 0.923. [α] $_D^{25}$ – 2.54°.

Et ester: b.p. 68°/25 mm. D_4^{20} 0.878. [α] $_D^{20}$ – 4.67°.

dl.

F.p. – 41.6°. B.p. 197.2–197.8°. D_4^0 0.9441, D_4^{20} 0.9262. n_D^{20} 1.4159.

Et ester: b.p. 157–8°.

Phenylphenacyl ester: m.p. 47°.

Chloride: b.p. 142.5–143.0°/749 mm. D_4^0 0.9963, D_4^{20} 0.9781.

Amide: needles. M.p. 124.9°.

Anilide: m.p. 87.0°.

p-Toluidide: m.p. 74.8°.

Hommelen, *Bull. soc. chim. Belg.*, 1933, 42, 243.

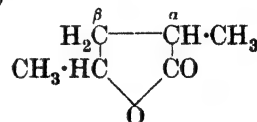
Levene, Marker, *J. Biol. Chem.*, 1931, 91, 77, 412.

Vliet, Marvel, Hsueh, *Organic Syntheses*, 1931, XI, 76.

3-Methylvaleric Acid.

See Isocaproic Acid.

α -Methyl- γ -valerolactone (*$\alpha\gamma$ -Dimethylbutyrolactone*)



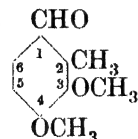
B.p. 201°. Sol. 20–25 parts H₂O.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, 33, 820.

β -Methyl- γ -valerolactone (*$\beta\gamma$ -Dimethylbutyrolactone*).

B.p. 213°.

Blaise, *Bull. soc. chim.*, 1903, 29, 335.

2-Methylveratric Aldehyde (5 : 6-Dimethoxy-o-toluic aldehyde)

$C_{10}H_{12}O_3$ MW, 180

Needles from pet. ether. M.p. 52–3°. Spar. sol. pet. ether.

Oxime: needles from MeOH. M.p. 98–9°. Sol. most org. solvents. Spar. sol. H_2O , pet. ether.

Semicarbazone: plates from EtOH. M.p. 220°. Spar. sol. boiling EtOH.

Perkin, *J. Chem. Soc.*, 1916, 109, 915.

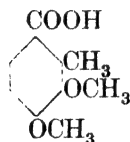
6-Methylveratric Aldehyde (4 : 5-Dimethoxy-o-toluic aldehyde).

Needles from H_2O . M.p. 76°.

Oxime: cryst. from EtOH. M.p. 128°.

Semicarbazone: needles from EtOH. M.p. 218°.

Kuroda, Perkin, *J. Chem. Soc.*, 1923, 123, 2110.

2-Methylveratric Acid (5 : 6-Dimethoxy-o-toluic acid)

$C_{10}H_{12}O_4$ MW, 196

Needles from H_2O . M.p. 177°. Spar. sol. cold H_2O .

Me ester: $C_{11}H_{14}O_4$. MW, 210. Needles from pet. ether. M.p. 46–8°. Sol. most org. solvents.

Perkin, *J. Chem. Soc.*, 1916, 109, 920.

Methylveratrol.

See Homoveratrol and under 2 : 3-Dihydroxy-toluene.

3-Methylvinylacetic Acid.

See 2-Ethylidenepropionic Acid.

3-Methylvinylacetylene.

See Isopropenylacetylene.

Methylvinylcarbinol (1-Butenol-3, 1-vinylethyl alcohol, 3-hydroxy-1-butylene, 1-methylallyl alcohol)



C_4H_8O MW, 72

d.

$D_4^{15.5}$ 0.8362.

Acid phthalate needles from pet. ether. M.p.

52–3°. $[\alpha]_D + 40.5^\circ$. *Brucine salt*: leaflets from Me_2CO . M.p. 120–2°.

l.

Acid phthalate: cryst. from ligroin. M.p. 52–3°. $[\alpha]_D - 40.6^\circ$ in EtOH.

dl.

Constituent of wood spirit oil. B.p. 94–6°. Sol. H_2O . D_4^0 0.854, D_4^{22} 0.835. $n_D^{20.5}$ 1.4087.

Acetyl: b.p. 112°.

Trichloroacetyl: b.p. 74.0–74.5°/12 mm., 69.5–70.5°/9 mm. D_4^{22} 1.2990. n_D^{22} 1.4588.

p-Nitrobenzoyl: cryst. from EtOH. M.p. 43–4°.

Allophanate: m.p. 152°.

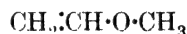
Acid phthalate: cryst. M.p. 5°.

Delaby, *Compt. rend.*, 1922, 175, 967.

Baudringhien, *Bull. soc. chim. Belg.*, 1922, 31, 160.

Claisen, Tietze, *Ber.*, 1926, 59, 2348.

Kenyon, Snellgrove, *J. Chem. Soc.*, 1925, 127, 1174.

Methyl vinyl Ether

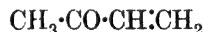
C_3H_6O MW, 58

B.p. 12–14° (9°).

Chalmers, *Chem. Abstracts*, 1933, 27, 701.

I.G., F.P., 724,955, (*Chem. Abstracts*, 1932, 26, 4825).

Methyl vinyl Ketone (1-Butenone-3, 3-keto-1-butylene, methyleneacetone, acetoethylene)



C_4H_6O MW, 70

B.p. 79–80°, 62–8°/400 mm., 33–4°/130 mm. Sol. H_2O , EtOH, MeOH, Et₂O, Me₂CO, AcOH. D_4^{20} 0.8636. n_D^{20} 1.4086. Powerful irritating odour. Polymerises on standing.

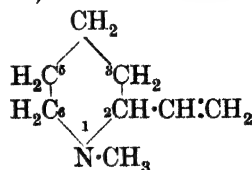
Semicarbazone: m.p. 140–1°.

Krapiwin, *Chem. Zentr.*, 1910, I, 1336.

Wohl, Priill, *Ann.*, 1924, 440, 142.

Du Pont, F.P., 719,309, (*Chem. Abstracts*, 1932, 26, 3265); U.S.P., 1,967,225, (*Chem. Abstracts*, 1934, 28, 5834).

N-Methyl-2-vinylpiperidine (N-Methyl-2-piperidylethylene)



$C_8H_{15}N$ MW, 125

B.p. 60°/12 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O. Volatile in steam. Polymerises on dist. at ord. press.

B,HAuCl₄: cryst. from H₂O. M.p. 115–20°. Sol. warm H₂O, EtOH.

B₂,H₂PtCl₆: cryst. from H₂O. M.p. 188°. Spar. sol. cold H₂O, EtOH.

Heidrich, *Ber.*, 1901, **34**, 1889.

6-Methyl-2-vinylpiperidine (6-*Methyl-2-piperidylethylene*).

B.p. 150°. *D*₄¹⁵ 0.8381. Sol. EtOH, Et₂O. Spar. sol. H₂O.

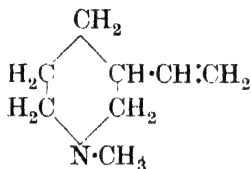
B,HCl: needles. M.p. 242.5–243°.

B₂,H₂PtCl₆: needles from EtOH. M.p. 176°.

Picrate: plates from EtOH. M.p. 123°.

Löffler, Remmler, *Ber.*, 1910, **43**, 2053.

N-Methyl-3-vinylpiperidine (N-*Methyl-3-piperidylethylene*)



C₈H₁₅N MW, 125

B.p. 161–2°/724 mm. Sol. 30–35 parts cold H₂O.

B,HAuCl₄: prisms from H₂O. M.p. 58–9°. Sol. warm H₂O, cold EtOH.

B,HCl,6HgCl₂: cryst. M.p. 177–8°. Sol. hot H₂O.

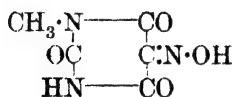
B₂,H₂PtCl₆: orange-red prisms or plates. M.p. 185–6° decomp. Spar. sol. cold H₂O.

Picrate: yellow prisms or needles. M.p. 193–4°. Spar. sol. H₂O.

Lipp, *Ann.*, 1897, **294**, 150.

Lipp, Widmann, *Ber.*, 1905, **38**, 2481.

1-Methylvioluric Acid



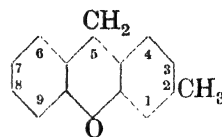
C₅H₅O₄N₃ MW, 171

Leaflets from H₂O. M.p. 202–3° decomp. Sol. MeOH, Me₂CO, AcOH. Less sol. EtOH, CHCl₃, AcOEt. Spar. sol. C₆H₆, Et₂O, ligroin.

Urea deriv.: needles from EtOH. M.p. 190° decomp. Sol. H₂O, MeOH, EtOH, AcOH. Less sol. Me₂CO, AcOEt. Spar. sol. Et₂O, C₆H₆, CHCl₃, ligroin.

Biltz, Hamburger, *Ber.*, 1916, **49**, 644.

2-Methylxanthene

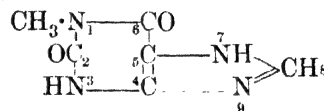


C₁₄H₁₂O MW, 196

Plates from MeOH. M.p. 121°.

Borsche, Geyer, *Ber.*, 1914, **47**, 1157.

1-Methylxanthine



C₆H₆O₂N₄ MW, 166

Cryst. from H₂O. Sol. alkalis and dil. acids. Spar. sol. H₂O.

Engelmann, *Ber.*, 1909, **42**, 177.

3-Methylxanthine.

Needles from H₂O. Decomp. above 360°. Sol. 350 parts boiling H₂O. Very sol. dil. alkalis.

Fischer, Ach, *Ber.*, 1898, **31**, 1986.

Traube, Nithack, *Ber.*, 1906, **39**, 227.

7-Methylxanthine (Heteroxanthine).

Needles from H₂O. M.p. 380° decomp. Spar. sol. H₂O. Insol. EtOH, Et₂O. Sol. NH₃ and hot HCl. Not pptd. by picric acid.

Sarasin, Wegmann, *Helv. Chim. Acta*, 1924, **7**, 713.

8-Methylxanthine.

Prisms or leaflets from hot H₂O. Decomp. at 292–3° (380°). Sol. about 3,300 parts hot H₂O. Sol. NH₃ and alkalis.

B,HCl: prisms from conc. HCl. Decomp. by H₂O.

Boehringer, Söhne, D.R.P., 121,224, (*Chem. Zentr.*, 1901, II, 71).

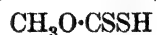
Biltz, Schmidt, *Ann.*, 1923, **431**, 86.

9-Methylxanthine.

Needles. M.p. 384° decomp. Sol. 280 parts boiling H₂O.

Boehringer, Söhne, D.R.P., 120,437, (*Chem. Zentr.*, 1901, I, 1219).

Methylxanthogenic Acid (*Methoxydithioformic acid, methylxanthic acid*)



C₂H₄OS₂ MW, 108

Not known in free state.

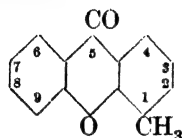
Me ester: C₃H₆OS₂. MW, 122. B.p. 167–8°. *D*₄¹ 1.2030, *D*₄¹⁶ 1.1860. *n*_D²⁰ 1.5704.

Et ester: $C_4H_8OS_2$. MW, 136. B.p. 184° . D_4^{16} 1.330. n_D^{16} 1.554.

Propyl ester: $C_5H_{10}OS_2$. MW, 150. Yellow liq. B.p. $201-3^\circ$. D_4^0 1.1074. $n_4^{16.5}$ 1.0917, $n_D^{16.5}$ 1.5405.

Delépine, *Compt. rend.*, 1910, **150**, 877.

1-Methylxanthone



$C_{14}H_{10}O_2$ MW, 210

Needles from boiling ligroin. M.p. 126° . Sol. EtOH, Et₂O, C₆H₆. Insol. H₂O. Conc. H₂SO₄ → yellow sol. with bluish-green fluor.

Ullmann, Zlokasoff, *Ber.*, 1905, **38**, 2114.

2-Methylxanthone

Needles from EtOH. M.p. 98° .

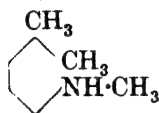
Borsche, Geyer, *Ber.*, 1914, **47**, 1158.

3-Methylxanthone.

Needles. M.p. 121° . Sol EtOH, C₆H₆, AcOH. Mod. sol. boiling ligroin. Conc. H₂SO₄ → yellow sol. with green fluor.

Ullmann, Zlokasoff, *Ber.*, 1905, **38**, 2115.

N-Methyl-o-3-xylidine



$C_9H_{13}N$ MW, 135

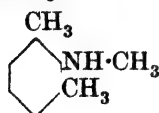
Oil. B.p. $222-3^\circ$.

B, HCl: needles.

N-Acetyl: $C_{11}H_{15}ON$. MW, 177. Cryst. from ligroin. M.p. 75° . Volatile in steam. B_2HAuCl_4 : yellow cryst. M.p. 173° .

Menton, *Ann.*, 1891, **263**, 317.

N-Methyl-m-2-xylidine



$C_9H_{13}N$ MW, 135

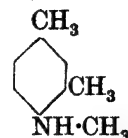
Oil. B.p. $206-7^\circ$. Volatile in steam.

N-Acetyl: $C_{11}H_{15}ON$. MW, 177. Plates or needles from EtO₂. M.p. $94-5^\circ$. Sol. H₂O, most org. solvents. Volatile in steam.

Friedländer, Brand, *Monatsh.*, 1898, **19**, 642.

Bamberger, Rudolf, *Ber.*, 1906, **39**, 4291.

N-Methyl-m-4-xylidine



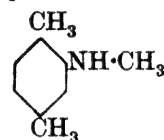
$C_9H_{13}N$ MW, 135

Oil. B.p. $220.5-221.5^\circ/760$ mm.

N-Acetyl: $C_{11}H_{15}ON$. MW, 177. Needles or prisms from ligroin. M.p. 65° . Very sol. most solvents. Spar. sol. ice-cold ligroin.

Pinnow, Oesterreich, *Ber.*, 1898, **31**, 2930.

N-Methyl-p-xylidine



$C_9H_{13}N$ MW, 135

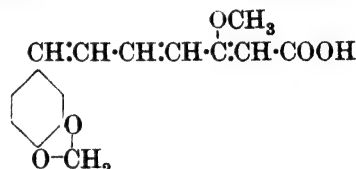
Yellow oil. B.p. $225-7^\circ/735$ mm. Readily volatile in steam.

Pflug, *Ann.*, 1889, **255**, 172.

Methyl-xyloside.

See under Xylose.

Methysticic Acid (*Isomethysticin*)



$C_{15}H_{14}O_5$ MW, 274

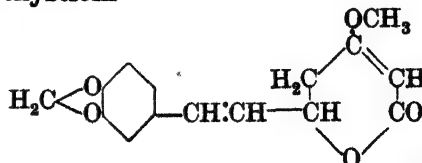
Product of action of alkalis upon methysticin. Yellow needles from Me₂CO. M.p. $191-2^\circ$ decomp. ($187-8^\circ$). MeOH or EtOH sol. gives no immediate col. with FeCl₃. Conc. H₂SO₄ → deep purple-red col.

Me ester: $C_{16}H_{16}O_5$. MW, 288. Yellow prisms from MeOH. M.p. $162-4^\circ$. HCl in MeOH → allomethysticin, m.p. $133-4^\circ$.

Borsche, Blount, *Ber.*, 1930, **63**, 2419.

Borsche, Meyer, Peitzsch, *Ber.*, 1927, **60**, 2113.

Methysticin



$C_{15}H_{14}O_5$ MW, 274

Constituent of resin from Kawa root (*Piper methysticum*, Linn.). Needles from MeOH, prisms from Me₂CO. M.p. 136–7°. Sol. hot EtOH, CHCl₃, C₆H₆. Spar. sol. hot H₂O, pet. ether, Et₂O. Insol. cold alkalis. Heat with dil. HCl → methysticone. With aq. alkalis short heat. → methysticic acid, long heat. → piperonal. KOH fusion → protocatechuic acid.

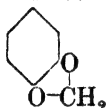
Borsche *et al.*, *Ber.*, 1929, **62**, 360; 1927, **60**, 982, 2113; 1921, **54**, 2229; 1914, **47**, 2909.

Cf. Lampé, Sandrowski, *Bull. soc. chim.*, 1930, **47**, 469.

Methysticol.

See Methysticone.

Methysticone (Methysticol)



C₁₃H₁₈O₃

MW, 216

Product of hyd. of methysticin. M.p. 89.5–90.5°.

γ-Carbomethoxyl: C₁₅H₁₄O₅. MW, 274. Golden-yellow needles from pet. ether. M.p. 103°.

Phenylhydrazone: yellow needles from MeOH. M.p. 155–7°.

2:4-Dinitrophenylhydrazone: reddish-brown needles from CHCl₃. M.p. 236–7° decomp.

Borsche *et al.*, *Ber.*, 1927, **60**, 1139, 2117; 1929, **62**, 360.

Metol.

See under *p*-Methylaminophenol.

Metoquinone

C₂₀H₂₄O₄N₂

MW, 356

Add. comp. of hydroquinone + 2 mols. *p*-methylaminophenol. Cryst. from H₂O. M.p. 135°. Photographic developer.

Muller, *Chem. Zentr.*, 1926, **II**, 1230.

Lumière, Seyewitz, *Industrie Chimique*, 1927, **14**, 217, (*Chem. Abstracts*, 1927, **21**, 3569).

Mezcaline.

See Mescaline.

Michler's Hydrol.

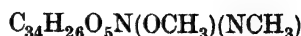
See Tetramethyldiaminobenzhydrol.

Michler's Ketone.

See Tetramethyldiaminobenzophenone.

Diet. of Org. Comp.—II.

Micranthine



C₃₈H₃₂O₆N₂

MW, 588

Alkaloid from *Daphnandra micrantha*, Benth. Needles + $\frac{1}{2}$ CHCl₃ from CHCl₃. M.p. 196° decomp. (sinters above 190°). Spar. sol. EtOH, CHCl₃. Insol. H₂O, Et₂O. Fröhde's reagent → indigo to emerald-green col.

B₂H₂SO₄: needles + 10H₂O. Decomp. (anhyd.) at 312°. Mod. sol. hot H₂O.

Pyman, *J. Chem. Soc.*, 1914, **105**, 1679.

Microl

C₁₃H₁₈O₂

MW, 206

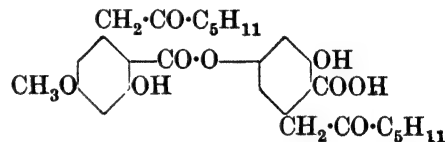
Phenol contained in the essential oil of *Phachium* or *Cinnamomum micranthum*, Hayata. B.p. 133–6°/4 mm. D₄²⁰ 1.0113. n_D²⁰ 1.5252. Dextro-rotatory.

Phenylurethane: m.p. 101°.

1-Naphthylurethane: m.p. 116–17°.

Ikeda, *J. Chem. Soc. Japan*, 1930, **51**, 349, (*Chem. Abstracts*, 1931, **25**, 3438).

Microphyllinic Acid



C₂₉H₃₆O₉

MW, 528

Lichen acid from *Cetraria collata* f. *microphylla*, Müll. Arg., A. Zahlbruckner. Colourless needles from C₆H₆-pet. ether. M.p. 116°. Sol. Et₂O, Me₂CO, EtOH, C₆H₆. Insol. pet. ether. FeCl₃ on EtOH sol. → violet col.

Me ester: C₃₀H₃₈O₉. MW, 542. Needles from EtOH. M.p. 118°.

Asahina, Fuzikawa, *Ber.*, 1935, **68**, 80.

Milk sugar.

See Lactose.

Mitragynine



C₂₂H₃₁O₅N

MW, 389

Alkaloid with local anæsthetic properties from *Mitragyna speciosa*, Korth. Amorph. M.p. 102–6°. B.p. 230–40°/5 mm.

B.HCl: leaflets from EtOH-Et₂O. M.p. 243°.

B.CH₃COOH: silky needles from AcOH-Et₂O. M.p. 142°.

B.CCl₃COOH: needles from Me₂CO-Et₂O. M.p. 157°.

Picrate: slender orange-red needles from AcOH or MeOH. M.p. 223–4°.

Field, *J. Chem. Soc.*, 1921, **119**, 887.

Raymond-Hamet, Millet, *Bull. sci. pharmacol.*, 1933, **40**, 593, (*Chem. Abstracts*, 1934, **28**, 1041).

Mitraversine

$C_{22}H_{26}O_4N_2$ $C_{20}H_{20}O_2N_2(OCH_3)_2$ MW, 382

Alkaloid from *Mitragyna diversifolia*, Hook. f. M.p. 237°. Easily sol. acids and alkalis.

B, HCl: m.p. 208–10°.

See previous references.

Mitrinermine

$C_{22}H_{28}O_4N_2$ $C_{20}H_{22}O_2N_2(OCH_3)_2$ MW, 384

Alkaloid from various species of *Mitragyna*. Cryst. from Me_2CO . M.p. 202–16°. Gives no col. with Fröhde's reagent or with H_2SO_4 .

Raymond-Hamet, Millet, *Chem. Zentr.*, 1935, I, 3937; *Compt. rend.*, 1934, **199**, 587; *Compt. rend. soc. biol.*, 1934, **116**, 1337.

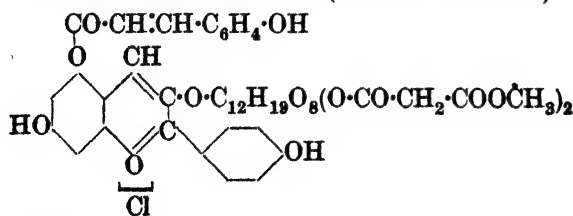
Mochyl Alcohol

$C_{26}H_{46}O$ $C_{26}H_{45}\cdot OH$ MW, 374

Constituent of Japanese bird-lime. Tufts of slender prisms from EtOH. M.p. 234° (222°). Sublimes in a vacuo. Sol. Et_2O , EtOH. Insol. H_2O ; pet. ether. Conc. H_2SO_4 → red col. *Acetyl*: m.p. 203°.

Yanagisawa, *Chem. Zentr.*, 1921, III, 551. Divers, Kawakita, *J. Chem. Soc.*, 1888, **53**, 274.

Monardaein chloride (*Salvinin chloride*)



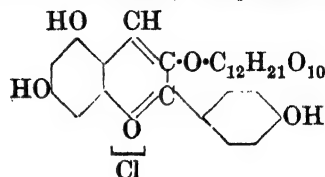
$C_{44}H_{46}O_{23}Cl$ MW, 977.5

Colouring matter of "golden balm" (*Monarda didyma*, Linn.), of *Salvia coccinea*, Linn., and of *S. splendens*, Sello. Red powder. Easily sol. MeOH → yellowish-red col. without fluor. $[\alpha]_D - 374.5^\circ$ in 0.1% HCl. Aq. Sol. H_2O → scarlet sol. stable in the cold. H_2O sol. + Na_2CO_3 → violet col. which with excess

NaOH → light brown. Sol. hot dil. HCl. Hyd. by cold 2N/KOH → *p*-hydroxycinnamic acid + monardin. Hyd. by 20% HCl for 3 minutes at 100° liberates malonic acid.

Karrer, Widmer, *Helv. Chim. Acta*, 1929, **12**, 292; 1928, **11**, 837; 1927, **10**, 67.

Monardin chloride (*Pelargonidin diglucoside*)



$C_{27}H_{31}O_{15}Cl$ MW, 630.5

Product of action of cold alkali followed by conc. HCl upon monardaein. Fine red needles. M.p. 180° decomp. $[\alpha]_D - 244^\circ$, $[\alpha]_{614} - 133^\circ$, in 0.1% HCl. Sol. H_2O → orange-red sol. turning violet. Pptd. cryst. by 3–5% HCl. Sol. hot, spar. sol. cold MeOH. Aq. sols. + Na_2CO_3 → violet col. which with NaOH → light brown. Hyd. by 20% HCl → pelargonidin + glucose.

See last reference above.

Monascin

$C_{24}H_{30}O_6$ MW, 414

Fungal pigment from *Monascus purpureus*, Went., infesting rice and other foodstuffs. Glittering yellow leaflets from EtOH. M.p. 135–40° (sinters at 130°). Stable in solid form. Readily decomp. in solution. Sol. Et_2O , conc. H_2SO_4 , NaOH. Insol. H_2O . Pptd. from alc. NaOH by CO_2 . Ox. → mixture containing oxalic and butyric acids.

Saloman, Karrer, *Helv. Chim. Acta*, 1932, **15**, 18.

Monascoflavin

$C_{17}H_{22}O_4$ MW, 290

Oxidation-product of monascorubrin. Yellow rhombic plates. M.p. 145°. Sol. EtOH, C_6H_6 , AcOEt, Me_2CO , AcOH. Spar. sol. Et_2O , pet. ether. Br → dibromo-deriv., m.p. 175–83°. H (+ catalyst) → dihydro-deriv., m.p. 120° (sinters at 110°).

Nishikawa, *Chem. Abstracts*, 1933, **27**, 1629.

Monascorubrin

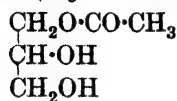
$C_{22}H_{24}O_5$ MW, 368

Fungal pigment from *Monascus purpureus*, Went., grown on artificial culture-medium. Cinnabar-red needles or prisms. M.p. 136°.

Sol. Et₂O, EtOH, MeOH, C₆H₆, CHCl₃, Me₂CO, AcOH. Insol. H₂O, pet. ether. H (+ catalyst) \rightarrow dihydro-deriv., reddish-yellow cryst., m.p. 95-6°.

See previous reference.

α -Mono-acetin (Glycerol 1-acetate)



C₅H₁₀O₄ MW, 134

B.p. 129-31°/3 mm., 103°/0.4 mm. D₄²⁰ 1.2060. n_D²⁰ 1.4157.

Mono-Me ether: C₆H₁₂O₄. MW, 148. B.p. 126-9°.

Di-Me ether: C₇H₁₄O₄. MW, 162. B.p. 100-10°/18 mm.

2:3-Di-p-nitrobenzoyl: m.p. 129-30°.

2-p-Nitrobenzoyl-3-benzoyl: leaves from AcOEt-pet. ether. M.p. 67-8°.

2:3-Distearyl: m.p. 55.2° (56.6°). n_D²⁰ 1.44045. Sol. 0.43 gram/100 c.c. EtOH at 23°.

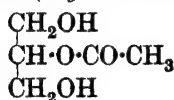
McElroy, King, *J. Am. Chem. Soc.*, 1934, 56, 1191.

Schuette, Hale, *J. Am. Chem. Soc.*, 1930, 52, 1978.

Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, 51, 866.

Fischer, Pfähler, *Ber.*, 1920, 53, 1606.

β -Mono-acetin (Glycerol 2-acetate)



C₅H₁₀O₄ MW, 134

Viscous oil. B.p. 177-8°/0.3 mm.

1:3-Benzylidene: m.p. 101°.

1:3-Distearyl: m.p. 62-3°. n_D²⁰ 1.43970. Sol. 0.06 gram/100 c.c. EtOH at 23°.

1:3-Dipalmityl: m.p. 54°.

1:3-Di-p-nitrobenzoyl: needles from EtOH or Me₂CO. M.p. 161°.

1:3-Disalicyloyl: m.p. 96-7°.

Bergmann, Carter, *Z. physiol. Chem.*, 1930, 191, 211.

Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, 51, 866.

See also first reference above.

Monobromohydrin.

See under Glycerol.

Monobutyryn.

See under n-Butyric Acid.

Monocaprin.

See under Glycerol.

Monocaproin.

See under Glycerol.

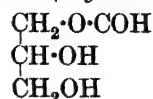
Monocaprylin.

See under Glycerol.

Monochlorohydrin.

See 3-Chloropropylene Glycol and 2-Chlorotrimethylene Glycol.

α -Monoformin (Glycerol 1-formate)



C₄H₈O₄ MW, 120

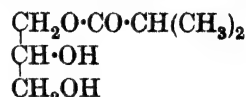
Unstable. Decomp. at 150° during vac. dist.

Delaby, Dubois, *Compt. rend.*, 1928, 187, 767.

Monoiodohydrin.

See under Glycerol.

α -Mono-isobutyryn (Glycerol 1-isobutyrate)



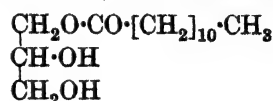
C₇H₁₄O₄ MW, 162

B.p. 264-6°, 158-61°/19 mm.

Guth, *Zeitschrift für Biologie*, 1903, 44, 97.

Cf. Gilchrist, Schuette, *J. Am. Chem. Soc.*, 1931, 53, 3480.

α -Monolaurin (Glycerol 1-laurate)



C₁₅H₃₀O₄ MW, 274

Leaflets from pet. ether-CCl₄. M.p. 63°.

2:3-Dimyristyl: m.p. 48.5°.

2:3-Dipalmityl: m.p. 54.5°.

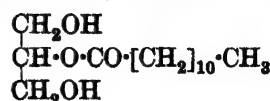
2:3-Distearyl: m.p. 51°.

Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, 51, 866.

Rewadikar, Watson, *J. Indian Inst. Sci.*, 1930, 13A, 128.

Fischer, Bergmann, Bärwind, *Ber.*, 1920, 53, 1600.

β -Monolaurin (Glycerol 2-laurate)



C₁₅H₃₀O₄ MW, 274

M.p. 51°. n_D²⁰ 1.44240.

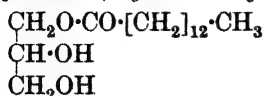
1:3-Benzylidene: m.p. 46.6°.

1 : 3-Dipalmityl : m.p. 64°.

Stimmel, King, *J. Am. Chem. Soc.*, 1934, 56, 1724.

See also first reference above.

α -Monomyristin (*Glycerol 1-myristate*)



$\text{C}_{17}\text{H}_{34}\text{O}_4$ MW, 302

M.p. 70–1° (67.3°).

2 : 3-Dilauryl : m.p. 42.8°. n_D^{20} 1.43878. Sol.

1.21 grams/100 c.c. EtOH at 23°.

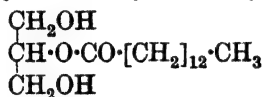
2 : 3-Dipalmityl : m.p. 55.5°.

Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, 51, 866.

McElroy, King, *J. Am. Chem. Soc.*, 1934, 56, 1191.

Rewadikar, Watson, *J. Indian Inst. Sci.*, 1930, 13A, 132.

β -Monomyristin (*Glycerol 2-myristate*)



$\text{C}_{17}\text{H}_{34}\text{O}_4$ MW, 302

M.p. 61°. n_D^{20} 1.44420.

1 : 3-Benzylidene : m.p. 62°.

1 : 3-Dilauryl : m.p. 50.2°. n_D^{20} 1.43907. Sol.

0.25 gram/100 c.c. EtOH at 23°.

1 : 3-Dimyristyl : m.p. 49.5°.

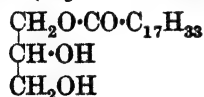
1 : 3-Dipalmityl : m.p. 59°.

1 : 3-Disalicyloyl : m.p. 34–5°.

Stimmel, King, *J. Am. Chem. Soc.*, 1934, 56, 1724.

See also first two references above.

α -Mono-olein (*Glycerol 1-oleate*)



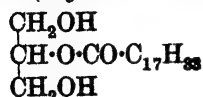
$\text{C}_{21}\text{H}_{40}\text{O}_4$ MW, 356

M.p. 35°. B.p. 238–40°/3–4 mm.

Krafft, Ber., 1903, 36, 4343.

Täufel, Künkele, *Chem. Zentr.*, 1935, I, 2971.

β -Mono-olein (*Glycerol 2-oleate*)

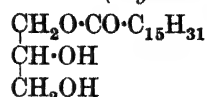


$\text{C}_{21}\text{H}_{40}\text{O}_4$ MW, 356

Plates from EtOH.Aq. M.p. 26°.

Bournot, *Biochem. Z.*, 1914, 65, 156.

α -Monopalmitin (*Glycerol 1-palmitate*)



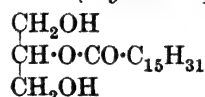
$\text{C}_{19}\text{H}_{38}\text{O}_4$ MW, 330

Plates from ligroin. M.p. 77°.

Fairbourne, Foster, *J. Chem. Soc.*, 1926, 3151.

Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, 51, 868.

β -Monopalmitin (*Glycerol 2-palmitate*)



$\text{C}_{19}\text{H}_{38}\text{O}_4$ MW, 330

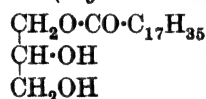
M.p. 69°. n_D^{20} 1.44605.

1 : 3-Benzylidene : m.p. 63.5°.

Fairbourne, Stephens, *J. Chem. Soc.*, 1932, 1975.

Stimmel, King, *J. Am. Chem. Soc.*, 1934, 56, 1724.

α -Monostearin (*Glycerol 1-stearate*)



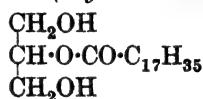
$\text{C}_{21}\text{H}_{42}\text{O}_4$ MW, 358

M.p. 82° (76°).

Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, 51, 866.

See also first reference above.

β -Monostearin (*Glycerol 2-stearate*)



$\text{C}_{21}\text{H}_{42}\text{O}_4$ MW, 358

M.p. 74.4°. n_D^{20} 1.44770.

1 : 3-Benzylidene : m.p. 69°.

Stimmel, King, *J. Am. Chem. Soc.*, 1934, 56, 1724.

Montanic Acid



$\text{C}_{23}\text{H}_{58}\text{O}_2$ MW, 438

Constituent of various natural waxes. Glistening scales. M.p. 89.3° (87°). Sol. CHCl_3 , C_6H_6 , pet. ether, hot EtOH, AcOEt, hot AcOH. Insol. cold Et_2O or EtOH. Decomp. above m.p. Heat to 370° + iron filings \rightarrow montanone.

Me ester: $C_{30}H_{60}O_2$. MW, 452. Scales from MeOH-pet. ether. M.p. 68.5° (66°). Sol. $CHCl_3$, C_6H_6 . Insol. cold Et_2O , EtOH.

Et ester: $C_{31}H_{62}O_2$. MW, 466. Needles from EtOH. M.p. $64-5^\circ$. Very sol. cold $CHCl_3$. Sol. C_6H_6 , pet. ether. Insol. cold Et_2O , EtOH.

Chloride: $C_{29}H_{57}OCl$. MW, 456.5. Leaflets from ligroin. M.p. 68° . Sol. C_6H_6 , ligroin. Spar. sol. Et_2O .

Amide: $C_{29}H_{59}ON$. MW, 437. Cryst. from EtOH. M.p. 112° (109°). Spar. sol. Me_2CO , ligroin.

Stadler, *Chem. Abstracts*, 1934, **28**, 1839, 5405.

Holde, Bleyberg, *Chem. Abstracts*, 1931, **25**, 189; 1930, **24**, 5520.

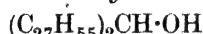
Legg, Wheeler, *J. Chem. Soc.*, 1929, 2444.
Gascard, Damoy, *Compt. rend.*, 1923, **177**, 1222.

Meyerheim, *Chem. Abstracts*, 1920, **14**, 361.

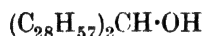
Ryan *et al.*, *Chem. Abstracts*, 1914, **8**, 2962; *J. Chem. Soc.*, 1913, **104**, i, 335.

Meyer, Brod, *Monatsh.*, 1913, **34**, 1143.

Montanol (*Dimontanylcarbinol*)



or



$C_{55}H_{112}O$ ($C_{57}H_{116}O$) MW, 788 (816)

M.p. 101° .

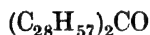
Acetyl: m.p. 66° .

Easterfield, Taylor, *J. Chem. Soc.*, 1911, **99**, 2302.

Montanone (*Dimontanyl ketone*)



or



$C_{55}H_{110}O$ ($C_{57}H_{114}O$) MW, 786 (814)

Cryst. from AcOH. M.p. 97° .

Oxime: m.p. 82.5° .

See previous reference.

Montanyl Alcohol



$C_{29}H_{60}O$ MW, 424

Contained in beeswax and in the wax of various plant cuticles. Rhombic plates from $CHCl_3$ or C_6H_6 . M.p. 84.5° . Very sol. warm $CHCl_3$, warm C_6H_6 . Spar. sol. cold solvents.

Acetyl: m.p. $68-9^\circ$.

Oxalate: m.p. 87° .

Phenylurethane: m.p. 96° .

Spies, Drake, *J. Am. Chem. Soc.*, 1932, **54**, 2935.

Legg, Wheeler, *J. Chem. Soc.*, 1929, 2444.

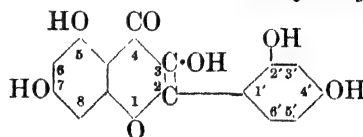
Montanyl iodide

$C_{29}H_{59}I$ MW, 534

Cryst. from Et_2O . M.p. 64.5° .

See first reference above.

Morin (3 : 5 : 7 : 2' : 4'-Pentahydroxyflavone)



$C_{15}H_{10}O_7$ MW, 302

Colouring matter of old fustic (wood of *Chlorophora tinctoria*, Gaudich). Pale yellow needles + $1H_2O$ from dil. AcOH. M.p. $286-8^\circ$ (sinters at 281°). Conc. $H_2SO_4 \rightarrow$ yellow sol. with bright bluish-green fluor. EtOH sol. + $FeCl_3 \rightarrow$ dark olive-green col.

Di-Me ether: $C_{17}H_{14}O_7$. MW, 330. Needles from EtOH. M.p. $225-7^\circ$.

Tri-Me ether: $C_{18}H_{16}O_7$. MW, 344. Needles from EtOH.Aq. M.p. 132° . Mod. sol. hot org. solvents. Very spar. sol. Et_2O , pet. ether.

2' : 3 : 4' : 7-*Tetra-Me ether*: $C_{19}H_{18}O_7$. MW, 358. Needles from EtOH. M.p. $131-2^\circ$.

Penta-Me ether: $C_{20}H_{20}O_7$. MW, 372. Needles from EtOH.Aq. M.p. $155-7^\circ$. *Mono-nitro deriv.*: m.p. $223-5^\circ$.

2' : 3 : 4' : 7-*Tetra-Et ether*: $C_{23}H_{26}O_7$. MW, 414. Needles from MeOH. M.p. $126-8^\circ$. 5-*Acetyl*: needles from MeOH. M.p. $121-3^\circ$.

2' : 3 : 4' : 7-*Tetra-acetyl*: needles. M.p. $142-5^\circ$.

Robinson, Venkataraman, *J. Chem. Soc.*, 1929, 61.

Perkin, Watson, *J. Chem. Soc.*, 1915, **107**, 198.

Benedikt, Hazura, *Monatsh.*, 1884, **5**, 167.

Morindin

$C_{26}H_{28}O_{14}$ MW, 564

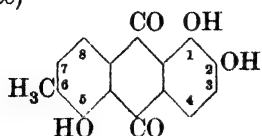
Glucosidic colouring matter from root-bark of various species of *Morinda*. Yellow needles from EtOH.Aq. M.p. $250-1^\circ$ rapid heat. (sinters at 235°), 245° slow heat. Alc. $H_2SO_4 \rightarrow$ morindone.

Octa-acetyl: m.p. $239-40^\circ$. Very spar. sol. cold EtOH.

Mell, *Chem. Abstracts*, 1929, **23**, 709.

Simonsen, *J. Chem. Soc.*, 1918, **113**, 766.

Morindone (1 : 5 : 6-Trihydroxy-2-methyl-anthraquinone)



$C_{15}H_{10}O_5$ MW, 270

The aglucone from morindin. Orange-red needles. M.p. 281-2° (275°).

Triacetyl: pale yellow needles. M.p. 255-6°.

Tribenzoyl: yellow needles. M.p. 233-4° (218-19°).

Mono-Me ether: $C_{16}H_{12}O_5$. MW, 284. Iridescent brown needles. M.p. 248°. *Diacetyl*: m.p. 245-6°.

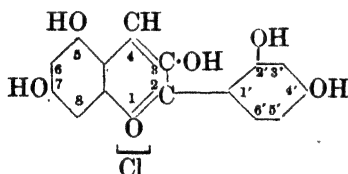
Di-Me ether: $C_{17}H_{14}O_5$. MW, 298. Yellow needles. M.p. 139°. *Acetyl*: m.p. 185°.

Tri-Me ether: $C_{18}H_{16}O_5$. MW, 312. Yellow needles. M.p. 229°.

Battacharya, Simonsen, *J. Indian Inst. Sci.*, 1927, 10A, 6.

Jacobson, Adams, *J. Am. Chem. Soc.*, 1925, 47, 283.

Morinidin chloride



$C_{15}H_{11}O_6Cl$ MW, 322.5

Bright red cryst. + $1H_2O$ from EtOH.Aq.-HCl. Darkens at 100°, does not melt at 300°. Na_2CO_3 .Aq. → blue col. in dil. sol., violet-blue to red-violet in conc. sol. Gives characteristic colour reactions in buffered sols. Conc. H_2SO_4 → yellow sol. with weak green fluor. The Et₂O extract after reduction with Zn dust and NaOH.Aq. → intense blue col. → brownish-green on heating.

3-Me ether: $C_{16}H_{13}O_6Cl$. MW, 336.5. Crimson needles from EtOH-HCl. Darkens at 200°, does not melt at 290°.

3 : 2' : 4'-Tri-Me ether: $C_{18}H_{17}O_6Cl$. MW, 364.5. Brick-red needles. Darkens at 250°, does not melt at 300°. *Perchlorate*: crimson needles.

Penta-Me ether: $C_{20}H_{21}O_6Cl$. MW, 392.5. Red needles with green reflex. Decomp. at 155°. *Ferrichloride*: red needles. Decomp. at 194°.

5-Benzoyl: red needles from MeOH-HCl. Na_2CO_3 .Aq. → bluish-violet col.

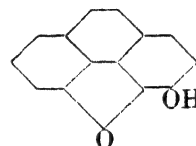
Charlesworth, Chavan, Robinson, *J. Chem. Soc.*, 1933, 372.

Gatewood, Robinson, *J. Chem. Soc.*, 1926, 1962.

Pratt, Robinson, *J. Chem. Soc.*, 1925, 127, 1182.

Willstätter, Schmidt, *Ber.*, 1924, 57, 1945.

Morphenol (3-Hydroxy-4 : 5-phenanthrylene oxide)



$C_{14}H_8O_2$ MW, 208

Needles from C_6H_6 . M.p. 145°. Sol. EtOH, Et₂O. NaOH.Aq. → yellow col. with blue fluor. Conc. H_2SO_4 → green fluor. in cold, blue on warming. Fuse with KOH at 250° → 3 : 4 : 5-trihydroxyphenanthrene.

Me ether: $C_{15}H_{10}O_2$. MW, 222. Needles from MeOH or EtOH. M.p. 65-8°. *Picrate*: dark red needles. M.p. 120-1°.

Et ether: $C_{16}H_{12}O_2$. MW, 236. Needles from EtOH. M.p. 59°.

Acetyl: needles from EtOH-AcOH. M.p. 140°. CrO_3 in AcOH → acetate of morphenolquinone.

Benzoate: needles from Et₂O. M.p. 123°.

Mosettig, Meitzner, *J. Am. Chem. Soc.*, 1934, 56, 2738.

Pschorr, Dickhäuser, *Ber.*, 1911, 44, 2639.

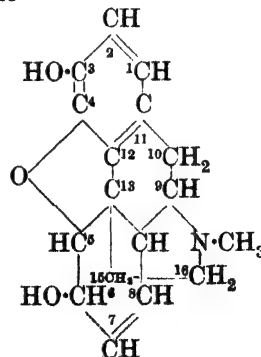
Knorr, Roth, *ibid.*, 2757.

Vongerichten, *Ber.*, 1901, 34, 2723; 1900, 33, 358.

Morphigenin.

See 9-Hydroxy-10-aminophenanthrene.

Morphine



$C_{17}H_{19}O_3N$ MW, 285

Principal alkaloid of opium. Colourless prisms + $1H_2O$ from EtOH.Aq. M.p. anhyd.

254° (230°) decomp. Solubilities as parts of solvent to 1 part of alkaloid : piperidine 1.5; Py 5; diethylamine 12.5; aniline 15; EtOH 50 at 20°, 30 at 79°; amyl alcohol 50 at 78°; AcOEt 537; Me₂CO 780 at 15°; CHCl₃ 1525; H₂O 3450 at 15°, 1040 at 80°, 400 at 99°; Et₂O 5000; C₆H₆ 9000. Sol. caustic alkalis. Spar. sol. NH₃. Very spar. sol. pet. ether. $[\alpha]_D^{25} - 130.9^\circ$ in MeOH, -70° in alk. sol. Behaves as monacid base. $k = 7.5 \times 10^{-7}$. The salts are neutral to litmus and to Methyl Orange.

B.HCl: silky needles + 3H₂O from dil. HCl. M.p. 200°. Sol. 19 parts glycerol, 24 parts H₂O. Very spar. sol. EtOH. $[\alpha]_D^{18} - 97.9^\circ$ in H₂O.

Acetate: B₂C₂H₄O₂. Cryst. + 3H₂O from EtOH.Aq. M.p. 200° decomp. Sol. 2.25 parts H₂O at 25°. Spar. sol. CHCl₃. $[\alpha]_D^{15} - 77^\circ$ in H₂O.

6-Acetyl: hydrochloride, needles from H₂O. M.p. 187°. $[\alpha]_D^{25} - 163^\circ$ in H₂O. *N-Oxide*: m.p. 205°.

Chloroacetyl: needles from EtOH. M.p. 234° decomp.

3:6-Di-chloroacetyl: cryst. from Et₂O. M.p. 135°.

3:6-Diacetyl: see Heroin.

3-Allyl ether: m.p. 67–8°. *Hydrochloride*, 1H₂O, m.p. 130°.

3-Me ether: see Codeine.

3:6-Di-Me ether: C₁₉H₂₃O₃N. MW, 313. Prisms or plates. M.p. 140–1°.

Di-Me ether methochloride: cryst. from EtOH. M.p. 208°. *Picrate*: m.p. 211–12°.

Di-Me ether methiodide: codeine Me ether methiodide. M.p. 251°.

3-Et ether: dionin. C₁₉H₂₃O₃N. MW, 313. Glittering prisms + 1H₂O from NH₃. M.p. 93° (119°). *B.HCl*: m.p. 123–5° (170°). B₂H₂SO₄: m.p. 207°. Sol. H₂O. Spar. sol. EtOH. *N-Oxide*: needles from H₂O. M.p. 220–1°. *Styphnate*: m.p. 155°.

Methochloride: colourless prisms + 2H₂O. M.p. 287–9°. $[\alpha]_D^{25} - 84.8^\circ$ in H₂O.

MeO-Me ether: C₁₇H₁₉O₂N (OCH₂·O·CH₃). Needles from EtOH.Aq. M.p. 94–6°. *Methiodide*: m.p. 225°.

Phenolsulphonyl: cryst. from Et₂O. M.p. 165°.

Phenylurethane: m.p. 127–30°.

Dott, *Chem. Abstracts*, 1932, 26, 1393; 1929, 23, 4535; 1913, 7, 1260.

Emde, *Helv. Chim. Acta*, 1930, 13, 1035.

Webr, *Chem. Abstracts*, 1929, 23, 4224.

Chemnitius, *ibid.*, 2244.

Hannich, *Chem. Zentr.*, 1916, II, 820.

ψ-Morphine (*Hydroxydimorphine*)

C₃₄H₃₆O₆N₂ MW, 568

Dimolecular base formed by gentle oxidation of morphine by various reagents. Physiologically inactive. Three forms.

α.

Cryst. from dil. NH₃. M.p. 276° (evacuated tube). $[\alpha]_D^{24} + 6.2^\circ$ in N/HCl. Spar. sol. H₂O and org. solvents.

β.

Cryst. from H₂O. M.p. 272° (evacuated tube). $[\alpha]_D^{25} - 77^\circ$ in N/HCl. Spar. sol. H₂O and org. solvents.

γ.

Granular cryst. + 3H₂O from dil. NH₃. M.p. 282–3° (evacuated tube). $[\alpha]_D^{24} + 44.8^\circ$ in N/HCl. Sol. conc. NH₃, benzyl alcohol, Py. Spar. sol. aniline. Insol. H₂O and ord. org. solvents. FeCl₃ → intense green col.

Tetra-acetyl: prisms from Et₂O. M.p. 189–91°. Very sol. EtOH. $[\alpha]_D^{25} + 57.5^\circ$ in EtOH.

Mono-Me ether: needles. $[\alpha]_D^{25} - 5.6^\circ$ in H₂O.

Small, Faris, *J. Am. Chem. Soc.*, 1934, 56, 1930.

Fulton, *Chem. Abstracts*, 1934, 28, 256.

Ball, Wolff, *J. Biol. Chem.*, 1928, 80, 403.

Morphine N-oxide

C₁₇H₁₉O₄N MW, 301

Prismatic cryst. from EtOH.Aq. M.p. 274–5°.

Nitrate: cryst. + 1½H₂O. M.p. 208°.

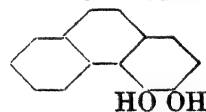
Di-Me ether: C₁₉H₂₃O₄N. MW, 329. Needles. M.p. 253°.

Dezeine, *Chem. Zentr.*, 1921, I, 292.

Mannich, *Chem. Zentr.*, 1916, II, 820.

Freund, Speyer, *Ber.*, 1915, 48, 499.

Morphol (3:4-Dihydroxyphenanthrene)



C₁₄H₁₀O₂ MW, 210

Needles from pet. ether. M.p. 143°. Sublimes in high vacuum at 130°. Ag₂O + anhyd. Na₂SO₄ in Et₂O → 3:4-phenanthraquinone. Rapidly oxidised in air especially in presence of alkalis.

Mono-Me ether: C₁₅H₁₂O₂. MW, 224. Needles. M.p. 62–3°. *Acetyl*: m.p. 130–1° *Picrate*: dark red needles with blue reflex. M.p. 150°.

Di-Me ether: C₁₆H₁₄O₂. MW, 238. Cryst. from MeOH. M.p. 45°. B.p. 298–303°/112 mm. *Picrate*: m.p. 105–6°.

3-Me ether-4-acetyl: $C_{17}H_{14}O_3$. MW, 266. Needles from EtOH. M.p. 131°.

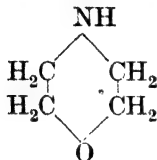
4-Me ether-3-acetyl: cryst. from EtOH.Aq. M.p. 93-4°.

Diacetyl: needles from Et₂O. M.p. 159°. Sublimes undecomp.

Barger, *J. Chem. Soc.*, 1918, 113, 219.

Pschorr, Dickhäuser, *Ber.*, 1912, 45, 1573; *Ann.*, 1910, 373, 80.

Morpholine (Tetrahydro-1 : 4-oxazine)



C_4H_9ON

MW, 87

Hygroscopic oil with ammoniacal odour and caustic alkaline properties. B.p. 128-30°. Misc. in all proportions with ord. solvents. Monacid base. Volatile in steam.

B,HCl: cryst. from HCl.Aq. M.p. 175-6°.

B,HAuCl₃: m.p. 240° decomp.

B₂,H₂PtCl₆: m.p. 210° decomp.

N-Benzoyl: cryst. from Et₂O. M.p. 74-5°.

N-Me: b.p. 116-17°/764 mm. D_4^{25} 0.9214.

B₂,H₂PtCl₆: m.p. 199°. **Methiodide:** m.p. 246°. **Picrate:** m.p. 225°.

N-Et: b.p. 138-9°/763 mm. D_4^{25} 0.9166.

B₂,H₂PtCl₆: m.p. 197-8°. **Picrate:** m.p. 189°.

N-Benzyl: b.p. 260°, 128-9°/13 mm. D_4^{25} 1.0340.

N-Nitroso: m.p. 29°. B.p. 224°/747 mm.

Picrate: m.p. 146-8°.

Picrolonate: m.p. 255° decomp.

p-Toluenesulphonamide: m.p. 147°.

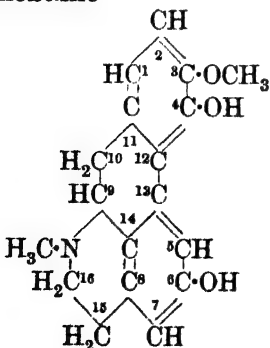
Sand, *Ber.*, 1901, 34, 2906.

Knorr, *Ann.*, 1898, 301, 1, 18.

Morpholquinone.

See 3 : 4-Dihydroxyphenanthraquinone.

Morphothebaine



$C_{18}H_{19}O_3N$

MW, 297

Product of action of fuming HCl on codeinone or on thebaine. Small stout needles from C_6H_6 . M.p. 197-8°. Sol. alkalis. Spar. sol. H_2O , EtOH. Insol. Et₂O. $[\alpha]_D^{25}$ -130° in EtOH. HNO_3 → blood-red col. Fröhde's reagent → steel-blue → yellowish-green col.

B,HCl: $[\alpha]_D^{25}$ -43.6° in H_2O .

Di-Me ether: $C_{20}H_{23}O_3N$. MW, 325. Oil, **B,HI:** m.p. 227° decomp. **d-Tartrate:** m.p. 205° decomp.; $[\alpha]_D^{25}$ -74.3° in H_2O . **Methiodide:** m.p. 187°. $[\alpha]_D^{25}$ -97.8° in EtOH. **Methosulphate:** m.p. 212°. $[\alpha]_D^{25}$ -73.7° in H_2O .

Emde, *Helv. Chim. Acta*, 1930, 13, 1054.

Kondo, Sanada, *Chem. Abstracts*, 1929, 23, 2978.

Gulland, Haworth, *J. Chem. Soc.*, 1928, 2038.

Schöpf, Borkowsky, *Ann.*, 1927, 458, 174.

Klee, *Chem. Zentr.*, 1914, II, 540.

Gadamer, *Z. angew. Chem.*, 1913, 26, 627.

Pschorr, *Ann.*, 1910, 373, 51, 64.

Moslene.

See $\Delta^{2,4}$ -p-Menthadiene.

Movragenic Acid

$C_{19}H_{28}O_5$

MW, 336

Product of hyd. of the saponin of *Bassia longifolia*, Linn.

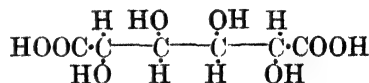
Na salt: glittering cryst. M.p. 229°. Sol. MeOH, EtOH, Me₂CO, alkalis.

Acetyl deriv.: m.p. 167°.

Benzoyl deriv.: m.p. 145°, anhyd. 155°.

Spiegel, Meyer, *Chem. Zentr.*, 1918, I, 1032.

Mucic Acid (Tetrahydroxyadipic acid)



$C_6H_{10}O_8$

MW, 210

Oxidation-product of lactose and other disaccharides. Prismatic cryst. from H_2O . M.p. 255° (rapid heat.) (225°, 208°). Mod. sol. hot H_2O . Very spar. sol. cold H_2O . Insol. EtOH. Py.Aq. at 140° → allomucic acid.

Mono-acetyl: prisms + $\frac{1}{2}H_2O$ from H_2O . M.p. 198°.

Tetra-acetyl: cryst. + $2H_2O$ from H_2O . M.p. anhyd. 243°. **Di-Et ester:** m.p. 189°. **Dichloride:** m.p. 189° (rapid heat.). **Diamide:** m.p. 290-2° decomp.

Hydrazide: $C_6H_{14}O_6N_4$. M.p. 215° decomp.

Di-Me ester: $C_8H_{14}O_8$. MW, 238. Needles from H_2O . M.p. 165-7° decomp.

Mono-Et ester: $C_8H_{14}O_8$. MW, 238. M.p. 190° decomp.

Di-Et ester: $C_{10}H_{18}O_8$. MW, 266. Leaflets from EtOH. M.p. 163–4°.

Mono-amide: mucamic acid. $C_6H_{11}O_7N$. MW, 209. Micro-cryst. from H_2O . Decomp. at 192° (turns brown at 175°). Forms cryst. Na, NH_4 , Ba, and Ca salts. *Penta-acetyl*: decomp. at 197°.

Hac, Hodina, *Bull. soc. chim.*, 1925, 37, 1242.

Simon, Guillaumin, *Compt. rend.*, 1924, 179, 1324.

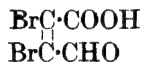
Acree, U.S.P., 1,816,137, (*Chem. Abstracts*, 1931, 25, 5554).

Bergmann, *Ber.*, 1921, 54, 1362.

Müller, *Ber.*, 1914, 47, 2654.

Posternak, *Helv. Chim. Acta*, 1929, 12, 1181.

Mucobromic Acid (*Dibromoaldehydoacrylic acid*)



$C_4H_2O_3Br_2$ MW, 258

Rhombic cryst. from hot H_2O . M.p. 125° (120–1°). Sol. EtOH, Et_2O , boiling H_2O . Spar. sol. cold $CHCl_3$, C_6H_6 .

Me ester: $C_5H_4O_3Br_2$. MW, 272. B.p. 230–4°. *Oxime*: m.p. 146–7°.

Oxime: m.p. 90° decomp.

Semicarbazone: prisms from EtOH. M.p. 215°.

Bromide: $C_4HO_3Br_3$. MW, 321. Cryst. from EtOH. M.p. 56–7°.

Amide: $C_4H_3O_2NBr_2$. MW, 257. M.p. 170° decomp.

ψ-Me ester: $C_5H_4O_3Br_2$. MW, 272. Plates from EtOH. M.p. 51°. B.p. 249–51°.

ψ-Et ester: cryst. from EtOH. M.p. 50–1°. B.p. 255–60° part. decomp.

ψ-Allyl ester: prisms. M.p. 41°.

Chavanne, *Compt. rend.*, 1911, 153, 185.

Diels, Reinbeck, *Ber.*, 1910, 43, 1273.

Simonis, *Ber.*, 1901, 34, 509, 517.

Mucochloric Acid (*Dichloroaldehydoacrylic acid*)



$C_4H_2O_3Cl_2$ MW, 169

Plates from hot H_2O . M.p. 127°. Sol. boiling H_2O , EtOH, Et_2O , hot C_6H_6 .

Oxime: needles + $\frac{1}{2}H_2O$. M.p. 90°. *Me ester*: m.p. 135°.

Chloride: $C_4HO_2Cl_3$. MW, 187.5. B.p. 100–1°/15 mm.

Amide: $C_4H_3O_2NCl_2$. MW, 168. Prisms from H_2O . M.p. 166°.

Beattie, Heilbron, Irving, *J. Chem. Soc.*, 1932, 264.

Simonis, *Ber.*, 1901, 34, 509, 517.

Dunlap, *Am. Chem. J.*, 1897, 19, 641.

Hill, Cornelison, *Am. Chem. J.*, 1894, 16, 304.

Muconic Acid (1:3-Butadiene-1:4-dicarboxylic acid, erythrene-1:4-dicarboxylic acid)



$C_6H_6O_4$ MW, 142

Needles from H_2O . M.p. 306–7° decomp. (rapid heat.), 289° decomp. (slow heat.). Sol. hot EtOH, AcOH. Sol. 5000 parts cold H_2O .

Mono-Me ester: $C_7H_8O_4$. MW, 156. Cryst. from C_6H_6 . M.p. 163°.

Di-Me ester: $C_8H_{10}O_4$. MW, 170. Two forms. (i) M.p. 158° (154°), b.p. 185°/12 mm. (ii) M.p. 75°.

Di-Et ester: $C_{10}H_{14}O_4$. MW, 198. Two forms. (i) M.p. 64° (62°), b.p. 200°/12 mm. (ii) M.p. 13°.

Diamide: $C_6H_8O_2N_2$. MW, 140. Plates from EtOH. Decomp. at 240°.

Karrer, Stoll, *Helv. Chim. Acta*, 1931, 14, 1190.

Vogt, *Chem. Zentr.*, 1926, I, 2340.

Pankoke, *Ann.*, 1925, 441, 188.

Farmer, *J. Chem. Soc.*, 1923, 123, 2531.

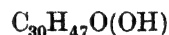
Behrend, Heyer, *Ann.*, 1919, 418, 294.

Stephen, Weizmann, *J. Chem. Soc.*, 1913, 103, 275.

Mudarín.

See Mudarol.

Mudarol (*Mudarín*)



$C_{30}H_{48}O_2$ MW, 440

Alcohol occurring as isovaleric ester in the root-bark of *Calotropis gigantea*, Dryand. Hexagonal plates from EtOH– Et_2O . M.p. 176°. Spar. sol. EtOH. CrO_3 in AcOH → mudaric acid, m.p. 225°.

Acetyl deriv.: $C_{32}H_{50}O_3$. MW, 482. Needles. M.p. 195–6°.

Isovaleric ester: $C_{35}H_{56}O_3$. MW, 524. Cryst. from EtOH. M.p. 140°. $[\alpha]_D^{25} + 128^\circ$ in Et_2O .

Hill, Sirkar, *J. Chem. Soc.*, 1915, 107, 1437.

Multiflorin (*Kaempferol rhamnoside*)

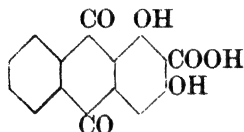
$C_{27}H_{30}O_{14}$ MW, 578

Glucoside contained in *Rosa multiflora*, Thunb.
M.p. 147–70°.

Penta-acetyl : m.p. 115–30°.

Kondo *et al.*, *Chem. Abstracts*, 1930, **24**,
1386.

Munjistin (1 : 3-Dihydroxyanthraquinone-2-carboxylic acid, purpuroxanthin-2-carboxylic acid)



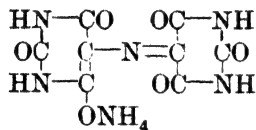
$C_{15}H_8O_6$

MW, 284

Occurs in *Rubia munjista*, Roxb. and in *Rubia sikkimensis*, Kurz. Golden-yellow needles from AcOH. M.p. 229–30°. Sublimes. Decomp. above m.p. \rightarrow purpuroxanthin. Sol. hot AcOH (green fluor.), hot EtOH, Et₂O, CHCl₃, C₆H₆. Conc. H₂SO₄ \rightarrow intense yellow col. NaOH.Aq. \rightarrow carmine-red sol. Hot conc. KOH.Aq. \rightarrow purpurin. Br in AcOH \rightarrow 2 : 4-dibromopurpuroxanthin.

Mitter, Biswas, *Ber.*, 1932, **65**, 622.

Murexide



$C_8H_8O_6N_6$

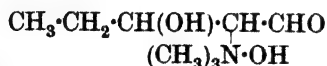
MW, 284

Ammonium salt of purpuric acid (the free acid cannot be isolated) formed by action of HNO₃.Aq. upon various purine derivs. Reddish cryst. with green lustre from H₂O saturated with NH₄Cl. Deep purple sol. in H₂O. KOH.Aq. \rightarrow deep blue col.

Mantzsch, Robison, *Ber.*, 1910, **43**, 92.

de Coninck, *Compt. rend. soc. biol.*, 1914,
75, 558.

Muscarine



$C_8H_{19}O_3N$

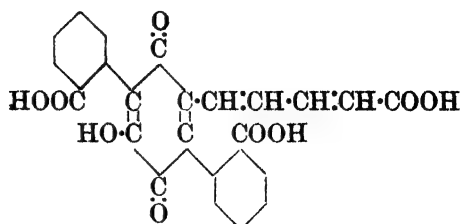
MW, 177

Main toxic constituent of "fly fungus," *Amanita muscaria*, Linn. Unstable in acid sol., stable to alkalis. $[\alpha]_D^{20} + 1.57^\circ$ in H₂O. Sols give aldehyde reactions. Hofmann degradation \rightarrow (CH₃)₃N + 1 : 2-dihydroxyvaleric acid.

Benzoyl deriv. : B₂H₂PtCl₆, yellow cryst. from HCl.Aq. M.p. 256–7° decomp.

Kögl, Duisberg, Erxleben, *Ann.*, 1931,
489, 156 (*Bibl.*).

Muscarufin



Suggested structure

$C_{25}H_{16}O_9$

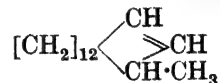
MW, 460

Pigment from "fly fungus," *Amanita muscaria*, Linn. Orange-red needles + 1H₂O from EtOH.Aq. M.p. anhyd. 275.5°. Sol. EtOH. Mod. sol. hot AcOH. Insol. Et₂O, CHCl₃, C₆H₆. Optically inactive. Conc. H₂SO₄ \rightarrow purple-red col. Zn dust in Ac₂O + AcONa \rightarrow triacetyl-leucomuscarufin, needles, m.p. 184°. Zn dust dist. \rightarrow 1 : 4-diphenylbenzene, m.p. 205°.

Mono-acetyl deriv. : m.p. 197°.

Kögl, Erxleben, *Ann.*, 1930, **479**, 11.

Muscene (3-Methylcyclopentadecylene)



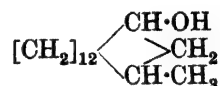
$C_{16}H_{30}$

MW, 222

Product of elimination of H₂O from muscol. B.p. 120°/1 mm. $[\alpha]_D^{20} - 8.8^\circ$.

Ruzicka, *Helv. Chim. Acta*, 1926, **7**, 722.

Muscol (3-Methylcyclopentadecanol)



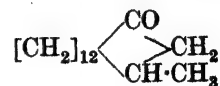
$C_{16}H_{32}O$

MW, 240

Product of reduction of natural muscone. M.p. 35°. B.p. 140°/1 mm. $[\alpha]_D^{20} + 14.9^\circ$.

See previous reference.

Muscone (3-Methylcyclopentadecanone)



$C_{16}H_{30}O$

MW, 238

l. Contained in natural musk. B.p. 130°/0.5 mm. $D_4^{17} 0.9221$. $n_D^{17} 1.4802$. $[\alpha]_D^{17} - 13.01^\circ$. Na + EtOH \rightarrow muscol.

Semicarbazone : m.p. 134°.

Phenylsemicarbazone : m.p. 158–60°.

dl-.

Synthetic product. B.p. 128°/1.2 mm. D_4^{20} 0.9214. n_D^{20} 1.4809.

Semicarbazone: m.p. 143–4° (133.5°, 136–7°, 134.5°).

Phenylsemicarbazone: m.p. 170–1°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1934, 17, 1308; 1926, 9, 715.

Ziegler, Weber, *Ann.*, 1934, 512, 164.

Mustard Gas.

See 2 : 2'-Dichlorodiethyl sulphide.

Mycol

$C_{29}H_{56}O$ $C_{29}H_{55}\cdot OH$ MW, 420

Alcohol occurring as esters with higher fatty acids in *Mycobacterium lacticola perrugosum*, in diphtheria, tubercle and other bacilli. Warty cryst. from EtOH. M.p. 66°. Sol. $CHCl_3$, toluene, xylene, pet. ether, Et_2O . Spar. sol. cold EtOH, MeOH.

Benzoate: m.p. 57°.

Goris, *Chem. Zentr.*, 1921, I, 580.

Bürger, *Biochem. Z.*, 1917, 78, 164.

Tamura, *Z. physiol. Chem.*, 1913, 87, 93, 107.

Mycose.

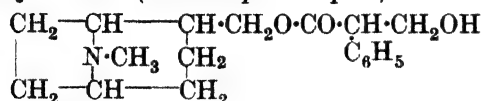
See Trehalose.

Mycosterol

$C_{30}H_{48}O_2$ $C_{30}H_{46}(OH)_2$ MW, 440

Constituent of various fungi. Long hexagonal cryst. from hot EtOH. M.p. 159–60°. $[\alpha]_D^{20}$ –129.4° in $CHCl_3$. Sol. Et_2O , $CHCl_3$, hot EtOH. Insol. H_2O . Forms digitonin comp., m.p. 242°.

Ikeguchi, *J. Biol. Chem.*, 1919, 40, 175.

Mydriasin (Homotropine tropate)

$C_{18}H_{25}O_3N$ MW, 303

Non-crystallizable oil. Very sol. EtOH. Mod. sol. Et_2O . Insol. H_2O . Powerful mydriatic.

$B_2H_2PtCl_6$: m.p. 192° (sinters at 185°).

v. Braun, *Ber.*, 1920, 53, 601; 1918, 51, 242.

Myrcene (2-Methyl-6-methylenooctadiene-2 : 7)

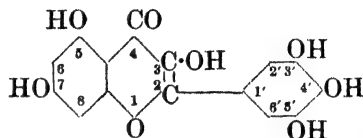
$C_{10}H_{16}$ $CH_2\cdot CH\cdot \overset{CH_3}{\underset{|}{C}}\cdot [CH_2]_2\cdot CH\cdot \overset{CH_3}{\underset{|}{C}}\cdot CH_3$ MW, 136

Constituent of bay, hop, and other essential oils. B.p. 166°, 51–51.5°/8.5 mm. D_4^{20} 0.8047. n_D^{20} 1.4722. Forms add. comp. with α -naphthoquinone, m.p. 80–81.5°.

Arbusow, Abramow, *Ber.*, 1934, 67, 1942.

Treibs, *Ber.*, 1934, 67, 942.

Goulding, Roberts, *J. Chem. Soc.*, 1914, 105, 2614.

Myricetin (3 : 5 : 7 : 3' : 4' : 5'-Hexahydroxyflavone)

$C_{15}H_{10}O_8$ MW, 318

Aglucone of myricitrin. Bright yellow needles from EtOH. M.p. 357–60° (blackens). Aq. alkalis \rightarrow green \rightarrow blue to violet col.

3 : 3' : 4' : 5'-Tetra-Me ether: $C_{19}H_{18}O_8$. MW, 374. Thin yellow plates from EtOH. M.p. 277°. Diacetyl: m.p. 159°.

5 : 7 : 3' : 4' : 5'-Penta-Me ether: $C_{20}H_{20}O_8$. MW, 388. Yellow needles from AcOH. M.p. 228–9°.

Hexa-acetyl: needles from EtOH. M.p. 214–16°.

Nierenstein, *Ber.*, 1928, 61, 361.

Kalff, Robinson, *J. Chem. Soc.*, 1925, 127, 183.

Hattori, Hayashi, *Chem. Abstracts*, 1932, 26, 990.

Myricitrin

$C_{21}H_{20}O_{12}$ MW, 464

Glucosidic colouring matter contained in the bark of *Myrica nagi*, Thunb., and *Myrica rubra*, S. and Z. Cryst. + $2H_2O$ from EtOH. Aq. M.p. anhyd. 197–9°. Very dil. $H_2SO_4 \rightarrow$ myricetin + rhamnose.

Hattori, Hayashi, *Chem. Abstracts*, 1932, 26, 990.

Komatsu, Nodzu, *Mem. Coll. Sci. Kyoto Imp. Univ.*, 1925, 8A, 223, (*Chem. Abstracts*, 1925, 19, 2840).

Myricyl Alcohol.

See Melissyl Alcohol.

Myristaldehyde.

See Myristic Aldehyde.

Myristic Acid (Tetradecic acid, tetradecylic acid)

$CH_3\cdot [CH_2]_{12}\cdot COOH$ $C_{14}H_{28}O_2$ MW, 228

Occurs widespread in vegetable glycerides. Leaflets. M.p. 58° (53·8°). B.p. 250·5°/100 mm., 199°/16 mm. D_4^{25} 0·8622, D_4^{70} 0·8533. n_D^{70} 1·4268. Spar. sol. cold EtOH, Et₂O.

Me ester: C₁₅H₃₀O₂. MW, 242. M.p. 18·5°. B.p. 155–7°/7 mm.

Et ester: C₁₆H₃₂O₂. MW, 256. M.p. 12·3°. B.p. 295°, 195°/30 mm., 162·5°/9 mm., 139°/4 mm. D_4^{25} 0·8573. n_D^{20} 1·4362.

Glycerol esters: see Monomyristin, Trimyristin, and under Glycerol.

Phenyl ester: C₂₀H₃₂O₂. MW, 304. M.p. 36°. B.p. 230°/15 mm.

Phenacyl ester: m.p. 56°.

p-Chlorophenacyl ester: m.p. 90°.

p-Bromophenacyl ester: m.p. 81°.

p-Tolyl ester: C₂₁H₃₄O₂. MW, 318. M.p. 39°. B.p. 239·5°/15 mm.

Chloride: C₁₄H₂₇OCl. MW, 246·5. B.p. 174°/16 mm. (168°/15 mm.).

Anhydride: m.p. 53·4°. D_4^{70} 0·8502. n_D^{70} 1·4335.

Amide: C₁₄H₂₉ON. MW, 227. M.p. 105–7°.

Nitrile: C₁₄H₂₇N. MW, 209. M.p. 19°. B.p. 226·5°/100 mm., 169°/13 mm.

Anilide: m.p. 84° (81·5°). B.p. 113°/10 mm.

p-Anisidide: m.p. 101·5°. B.p. 215·5°/10 mm.

o-Phenetidide: m.p. 77°.

p-Phenetidide: m.p. 111° (108°). B.p. 228·5°/10 mm.

Vanillylamide: α-form, m.p. 82°. β-form, m.p. 77°.

Phenylhydrazide: m.p. 108°.

2-Naphthylhydrazide: m.p. 139°.

Ford-Moore, Phillips, *Rec. trav. chim.*, 1934, **53**, 857.

Ruhoff, Reid, *J. Am. Chem. Soc.*, 1933, **55**, 3825.

Merckx, Verhulst, Bruylants, *Bull. soc. chim. Belg.*, 1933, **42**, 177.

Waterman, Bertram, *Rec. trav. chim.*, 1927, **46**, 699.

Verkade, Coops, *ibid.*, 528.

Beal, *Organic Syntheses*, 1926, VI, 66.

Holde, Gentner, *Ber.*, 1925, **58**, 1418.

De'Conno, *Gazz. chim. ital.*, 1917, **47**, i, 93.

Jacobson, Holmes, *J. Biol. Chem.*, 1916, **25**, 29, 55.

Levene, West, *J. Biol. Chem.*, 1914, **18**, 453.

Myristic Aldehyde (*Myristaldehyde*, *tetradecylaldehyde*)



C₁₄H₂₈O

MW, 212

Thin laminae. M.p. 23°. B.p. 155°/10 mm. Rapidly polymerizes to white solid, m.p. 65°.

Oxime: m.p. 82·5°.

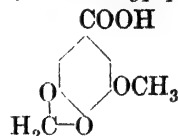
Semicarbazone: m.p. 106·5°.

p-Nitrophenylhydrazone: m.p. 95°.

Cyanhydrin: see under 1-Hydroxypentadecylic Acid.

Stephen, *J. Chem. Soc.*, 1925, **127**, 1876.

Myristicic Acid (3-Methoxy-4 : 5-methylenedioxybenzoic acid, 5-methoxypiperonylic acid)



C₉H₈O₅ MW, 196

Needles from MeOH. M.p. 212° (209–10°). Sol. EtOH. Spar. sol. H₂O. Conc. H₂SO₄ → yellow col. HI + P → gallic acid.

Di-Et ester: C₁₁H₁₂O₅. MW, 224. B.p. 193°/20 mm.

Chloride: C₉H₇O₄NCl. MW, 228·5. Needles from C₆H₆-pet. ether. M.p. 105°. B.p. 189–90°/20 mm.

Amide: C₉H₉O₄N. MW, 195. Needles + 1H₂O from H₂O. M.p. 184°. Sol. hot EtOH. Spar. sol. hot H₂O.

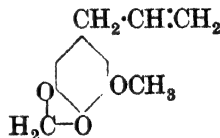
N-Diacetylamide: yellow needles from EtOH. M.p. 143°.

Baker, Montgomery, Smith, *J. Chem. Soc.*, 1932, 1283.

Salway, *J. Chem. Soc.*, 1909, **95**, 1161; 1911, **99**, 268.

Bignani, Testoni, *Gazz. chim. ital.*, 1900, **30**, 243.

Myristicin (3-Methoxy-4 : 5-methylenedioxy-1-allylbenzene)



C₁₁H₁₂O₃ MW, 192

Constituent of dill, nutmeg, parsley, and other essential oils. B.p. 157°/21 mm., 149·5°/15 mm. D_4^{20} 1·1437. n_D^{20} 1·5403. Heat + Na or alc. KOH → isomyristicin (*q.v.*). Br in pet. ether → dibromomyristicin dibromide, m.p. 129°.

Nitrosite: m.p. 130° decomp.

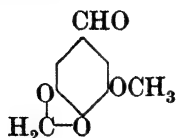
Thoms, *Ber.*, 1903, **36**, 3446.

Power, Salway, *J. Chem. Soc.*, 1907, **91**, 2054.

Balbiano, *Ber.*, 1909, **42**, 1506.

Pickles, *J. Chem. Soc.*, 1912, **101**, 1435, 1441.

Myristicinaldehyde (3-Methoxy-4:5-methylenedioxybenzaldehyde, 5-methoxypiperonal)



$C_9H_8O_4$

MW, 180

Needles from hot H_2O . M.p. 131° .

Oxime: m.p. $159-60^\circ$.

Baker, Montgomery, Smith, *J. Chem. Soc.*, 1932, 1283.

Rügheimer, Ritter, *Ber.*, 1912, 45, 1340.

Myristone (Di-n-tridecyl ketone, 14-ketoheptacosane, heptacosanone-14)

$CH_3[CH_2]_{12} \cdot CO \cdot [CH_2]_{12} \cdot CH_3$
 $C_{27}H_{54}O$ MW, 394

Flakes from EtOH. M.p. $77-8^\circ$. D_4^{21} 0.7986. PCl_5 at $190^\circ \rightarrow 13:14:14$ -trichloro-*n*-heptacosane.

Oxime: plates from EtOH or AcOH. M.p. 51° ($47-8^\circ$).

Gluud, *Ber.*, 1919, 52, 1051.

Jacobson, *J. Am. Chem. Soc.*, 1911, 33, 2048.

Myristyl Alcohol.

See Tetradecyl Alcohol.

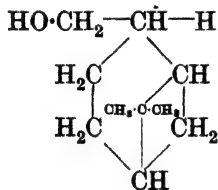
2-Myristylisobutyric Acid.

See Lichesterylic Acid.

Myronic Acid.

See Sinigrin.

Myrtanol (Cf. *Isomyrtanol*)



$C_{10}H_{18}O$

MW, 154

l-.

B.p. $127^\circ/22$ mm. D_4^{20} 0.9858. n_D^{20} 1.4898. $[\alpha]_D^{20} - 26.06^\circ$.

Acetyl: b.p. $128^\circ/19$ mm. D_4^{20} 1.0017. n_D^{20} 1.4700. $[\alpha]_D - 21.51^\circ$.

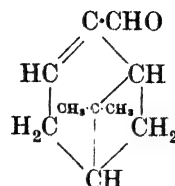
Acid phthalate: m.p. 109° . $[\alpha]_D - 15.0^\circ$.

dl-.

B.p. $122-3^\circ/19$ mm. D_4^{20} 0.9859. n_D^{21} 1.4894.

Dupont, Zacharewicz, *Compt. rend.*, 1934, 199, 365; 198, 1699.

Myrtenal



$C_{10}H_{14}O$

MW, 150

d-.

Oil with cinnamon odour. Polymerizes readily in air. B.p. $99-100^\circ/15$ mm., $92^\circ/12.5$ mm. D_{22}^{20} 0.9872. n_D^{20} 1.5030. $[\alpha]_D^{20} + 14.75^\circ$.

Oxime: m.p. $70.5-71.5^\circ$.

Semicarbazone: m.p. $229-30^\circ$ (225° , $220-1^\circ$) decomp.

Phenylsemicarbazone: decomp. at 180° .

dl-.

D_4^{20} 0.9969. n_D^{22} 1.5036.

Oxime: m.p. 101° .

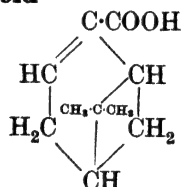
Semicarbazone: m.p. 200.5° .

Penfold, Ramage, Simonsen, *Chem. Zentr.*, 1935, I, 1066.

Dupont, Zacharewicz, Dulou, *Compt. rend.*, 1934, 198, 1699.

Rupe, *Ann.*, 1927, 459, 189.

Myrtenic Acid



$C_{10}H_{14}O_2$

MW, 166

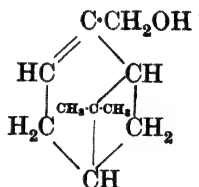
d-.

M.p. $53-4^\circ$.

Nitrile: $C_{10}H_{13}N$. MW, 147. B.p. $106^\circ/12$ mm. D_4^{20} 0.9654. n_D^{20} 1.4950. $[\alpha]_D + 54.89^\circ$.

Dupont, Zacharewicz, *Bull. soc. chim.*, 1935, 56, 536.

Myrtenol



$C_{10}H_{18}O$

MW, 154

d-.

B.p. $218^\circ/771$ mm., $103-4^\circ/11$ mm. D_4^{20} 0.9763. n_D^{20} 1.4967. $[\alpha]_D + 45.45^\circ$.

Benzoyl: b.p. $102.5-104^\circ/9$ mm. $[\alpha]_D + 45.32^\circ$.

Acid phthalate : m.p. 114–15°. $[\alpha]_D + 21.25^\circ$ in EtOH.

Phenylurethane : m.p. 58–9°.

1-Naphthylurethane : m.p. 92–3°.

dl.

$D^{20} 0.9849$. $n_D^{20} 1.4963$.

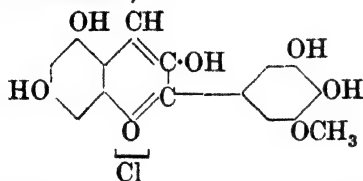
Acid phthalate : m.p. 120.5°.

Penfold, Ramage, Simonsen, *Chem. Zentr.*, 1935, I, 1065.

Rupe, *Ann.*, 1927, 459, 177.

See also previous reference.

Myrtillidin chloride (*Delphinidin 5-mono-methyl ether chloride*)



$C_{16}H_{13}O_7Cl$

MW, 352.5

Aglucone of myrtillin. Dark brown prisms + $1\frac{1}{2}H_2O$ from HCl.Aq.

Willstätter, Zollinger, *Ann.*, 1916, 412, 196, 206, 227; 1915, 408, 83.

Myrtillin chloride

$C_{22}H_{23}O_{12}Cl$

MW, 514.5

Glucoside pigment of the whortleberry. Dark bronze-brown flat prisms with metallic lustre. Cryst. + $4H_2O$ from MeOH-HCl. Sol. $H_2O \rightarrow$ red col. $FeCl_3$.Aq. \rightarrow blue col., violet on dilution. Hyd. by hot HCl.Aq. \rightarrow galactose + myrtillidin chloride.

Picrate : red needles. Spar. sol. H_2O .

Diemair, Hering, *Chem. Abstracts*, 1933, 27, 1982.

See also previous reference.

DICTIONARY OF ORGANIC COMPOUNDS

1943 SUPPLEMENT TO VOLUME II

Editors

SIR IAN HEILBRON, D.S.O., D.Sc., LL.D., F.R.I.C., F.R.S.

*Professor of Organic Chemistry at the Imperial College of
Science and Technology, London*

and

H. M. BUNBURY, M.Sc., F.R.I.C., *Barrister-at-Law*

Imperial Chemical Industries Ltd.

Assistant Editors

E. R. H. JONES, D.Sc., F.R.I.C.

and

W. E. JONES, Ph.D., A.R.I.C.

Authors

D. H. R. BARTON, Ph.D., A.R.C.S., H. COATES, Ph.D.,
A.R.C.S., J. H. GORVIN, Ph.D., A.R.I.C., A. W. JOHNSON,
Ph.D., A.R.C.S., A. LAMBERT, Ph.D., A.R.C.S., J. T.
McCOMBIE, B.Sc., A.R.C.S., R. A. RAPHAEL, B.Sc., A.R.C.S.,
A. SPINKS, Ph.D.

1943 SUPPLEMENT TO VOLUME II

E

Eburicoic Acid

$C_{30}H_{48}O_3$ MW, 456
Constituent of *Formes officinalis*, Fris. M.p. 283°.

Me ester: m.p. 141°. $[\alpha]_D^{21} + 37.2^\circ$. *Acetyl*: m.p. 150°. $[\alpha]_D^{22} + 56.9^\circ$.

Acetyl: m.p. 240°. $[\alpha]_D^{27} + 80^\circ$.

Kariyone, Kurono, *J. Pharm. Soc. Japan*, 1940, 60, 318.

Ecgonine.

Me ester: *cinnamoyl*: see Cinnamoylcocaine.

Echinonone

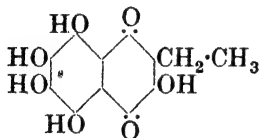
$C_{40}H_{58}O(\pm 2H)$ MW, 554(± 2)

Ketonic pigment isolated from sex glands of the sea urchin. Dark violet needles from pet. ether, C_6H_6 or MeOH. M.p. 192-3°. Absorption maxima in CS_2 , 5200, 4800, 4500 Å. Possesses vitamin A activity. Ether sol. + HCl \rightarrow blue col.

Lederer, *Compt. rend.*, 1935, 201, 300.

Lederer, Moore, *Nature*, 1936, 137, 996.

Echinochrome A (3 : 5 : 6 : 7 : 8-Penta-hydroxy-2-ethyl-1 : 4-naphthoquinone)



$C_{12}H_{10}O_7$ MW, 266

Pigment from mature ovaries of *Arbacia pustulosa* (sea urchin). Present as the prosthetic group of a high mol. weight complex which acts as a spermatozoa activating and agglutinating agent. Dark red needles from toluene. M.p. 220°. Sol. EtOH, Et_2O , Me_2CO . Spar. sol. $CHCl_3$. Prac. insol. pet. ether, H_2O . Sol. in dil. NaOH has bluish violet col. Absorption maxima in $CHCl_3$, 5330, 4970, 4620 Å; in C_6H_6 , 5320, 4940, 4610 Å.

Tri-Me ether: red needles. M.p. 129-30°. Absorption maxima in Et_2O , 5380, 5020, 4670 Å.

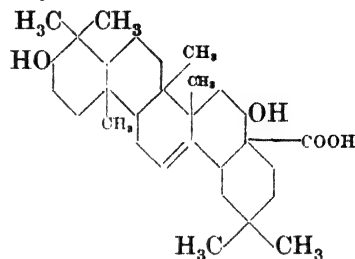
Lederer, Glaser, *Compt. rend.*, 1939, 208, 1939; 1938, 207, 454.

Kuhn, Wallenfels, *Ber.*, 1942, 75, 407; 1940, 73, 458; 1939, 72, 1407.

Wallenfels, Gauhe, *Ber.*, 1942, 75, 413.

Wallenfels, *ibid.*, 785.

Echinocystic Acid



Suggested structure

$C_{30}H_{48}O_4$ MW, 472

Triterpenoid sapogenin obtained by hyd. of saponin from various species of *Echinocystis*. Cryst. from EtOH, Et_2O , AcOH or CCl_4 . M.p. 305-12° decomp. $[\alpha]_{5461}^{26} + 40.6^\circ$ in EtOH.

Me ester: m.p. 213-15°. $[\alpha]_{5461}^{28} + 37.1^\circ$ in EtOH.

Diacetyl: m.p. 272-5°. $[\alpha]_{5461}^{27} - 14.6^\circ$ in $CHCl_3$.

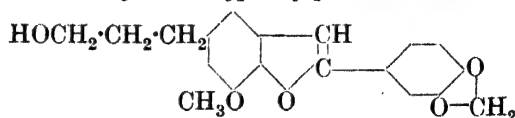
Bergsteinsson, Noller, *J. Am. Chem. Soc.*, 1934, 56, 1403.

White, Noller, *J. Am. Chem. Soc.*, 1939, 61, 983.

Noller, Carson, *J. Am. Chem. Soc.*, 1941, 63, 2238.

Bilham, Kon, Ross, *J. Chem. Soc.*, 1942, 532.

Egonol (7-Methoxy-5-[γ -hydroxypropyl]-2-[3' : 4'-methylenedioxyphenyl]-coumarone)



$C_{19}H_{18}O_5$ MW, 326

Constituent of the unsaponifiable portion of the seed oil of *Styrax japonicum*. Plates from butyl alcohol. M.p. 117.5-118°. B.p. 228-30°/0.15 mm. $CHCl_3$ sol. + $SbCl_5$ - $CHCl_3$ slowly gives blue col.

Acetyl: plates from EtOH. M.p. 107°.

p-Nitrophenylurethane: yellow plates from dichloroethane. M.p. 208-9°.

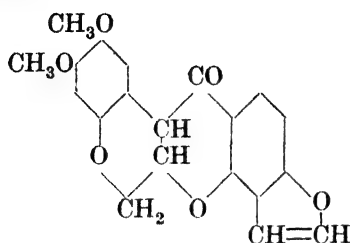
Kawai, Miyoshi, *J. Chem. Soc. Japan*, 1936, 57, 1233; *Ber.*, 1938, 71, 1457.

Kawai, Nakamura, Sugiyama, *Proc. Imper. Acad., Tokyo*, 1939, 15, 45.

Elaidic Acid.

Dibromide: see 8 : 9-Dibromostearic Acid.

Elliptone



$C_{20}H_{16}O_6$

MW, 352

l.

Constituent of roots of *Derris elliptica*. Needles from EtOH. M.p. 160° ($171-2^\circ$; affected by type of glass used). $[\alpha]_D^{20} - 18^\circ$ in C_6H_6 , $+55^\circ$ in Me_2CO . $AcONa$ in EtOH $\rightarrow dl$ -form.

Oxime: (α -). Needles from MeOH. M.p. 222° . (β -). Needles from MeOH. M.p. 236° .

dl.

Needles from EtOH. M.p. 183° .

Oxime: (α -). Leaflets from MeOH. M.p. 259° . (β -). Prisms from MeOH. M.p. 261° .

Monoacetyl: prisms from EtOH. M.p. 200° .

Harper, *J. Chem. Soc.*, 1939, 1099, 1424; 1942, 587, 593.

Emicymarin

$C_{30}H_{46}O_9$

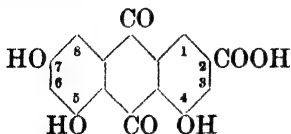
MW, 550

Cardiac glycoside from seeds of *Strophanthus Emini*. Needles or prisms + MeOH from MeOH. M.p. 207° . Spar. sol. H_2O . $[\alpha]_D^{20} + 15.8^\circ$, $[\alpha]_D^{20} + 12.8^\circ$, in EtOH. Conc. $H_2SO_4 \rightarrow$ orange sol. Positive Legal reaction. $MeOH-KOH \rightarrow$ isoemicymarin, m.p. about 270° . Boiling 2% $HCl \rightarrow$ digitalose.

Diacetyl deriv.: plates from MeOH. M.p. about 278° . $[\alpha]_D^{20} + 27.8^\circ$, $[\alpha]_D^{20} + 22.8^\circ$, in MeOH.

Lamb, Smith, *J. Chem. Soc.*, 1936, 442.

Emodic Acid (4 : 5 : 7-Trihydroxyanthraquinone-2-carboxylic acid)



$C_{16}H_8O_7$

MW, 300

Metabolic product of *Penicillium cyclopum*, Westling. Orange red needles from AcOH or

EtOH. Sublimed in vacuum, m.p. $363-5^\circ$. Spar. sol. ord. org. solvents.

Me ester: $C_{16}H_{10}O_7$. MW, 314. Orange red needles from MeOH. M.p. $268-9^\circ$. *Triacetyl*: pale yellow needles from AcOH. M.p. 188° .

Et ester: $C_{17}H_{12}O_7$. MW, 328. Reddish brown micro-needles from EtOH. M.p. 252° . Sol. alkalis with violet col.

Isobutyl ester: $C_{19}H_{16}O_7$. MW, 356. Orange red needles from C_6H_6 -pet. ether. M.p. 229° .

7-Me ether: $C_{16}H_{10}O_7$. MW, 314. Sublimes in vacuum in reddish brown needles. M.p. 300° . *Chloride*: cryst. from $SOCl_2$. M.p. 205° .

Amide: light brown needles from Py. M.p. 292° . *Diacetyl*: greenish yellow needles from AcOH. M.p. $214-15^\circ$.

Tri-Me ether: $C_{18}H_{14}O_7$. MW, 342. Pale yellow micro-cryst. from EtOH. M.p. 270° .

Triacetyl: yellow needles or prisms from AcOH. M.p. $218-19^\circ$.

Eder, Hauser, *Helv. Chim. Acta*, 1925, 8, 126.

Anslow, Breen, Raistrick, *Biochem. J.*, 1940, 34, 159.

Epicentrine.

See under Domesticine.

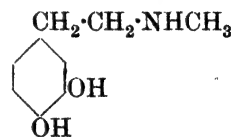
Epi-cholestanol.

See epi-Cholestanol.

Epidicentrine.

See under Domesticine.

Epinine (4-[β -Methylaminoethyl]-catechol, N-methyl-2-[3 : 4-dihydroxyphenyl]-ethylamine)



$C_9H_{13}O_2N$

MW, 167

Clusters of spikes from EtOH. M.p. $188-9^\circ$ corr. Exhibits hæmostatic and pressor properties.

B,HCl: prisms from H_2O . M.p. $179-80^\circ$ corr.

B,HBr: cryst. from EtOH. M.p. $169-71^\circ$.

B,H_2SO_4: prisms from H_2O . M.p. $289-90^\circ$ corr.

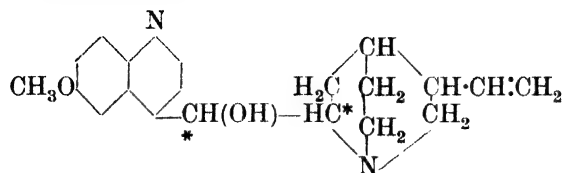
B,(COOH)_2: hexagonal plates from H_2O . M.p. $194-5^\circ$ corr.

Kindler, Hesse, *Arch. Pharm.*, 1933, 271, 439.

Buck, *J. Am. Chem. Soc.*, 1930, 52, 4119.

Pyman, *J. Chem. Soc.*, 1910, 97, 272.

Epiquinidine

 $C_{20}H_{24}O_2N_2$

MW, 324

Differs from quinidine in steric configuration at one of the carbon atoms marked *. Occurs in cinchona bark. Cryst. from AcOEt. M.p. 113°. $[\alpha]_D^{20} + 103.7^\circ$ in EtOH.

B, 2HCl: cryst. from EtOH. M.p. 195.7° decomp. $[\alpha]_D^{20} + 45.5^\circ$ in EtOH.

B, HBr, H2O: m.p. 240°.

B, HCN: m.p. 193°. $[\alpha]_D^{20} + 44.5^\circ$ in H_2O .

Acid tartrate: m.p. 130–5° decomp.

Benzoyl: m.p. 128–31°. $[\alpha]_D^{20} + 166^\circ$.

Dibenzoyl-d-tartrate: cryst. from Me_2CO or EtOH. M.p. 166–7° decomp. $[\alpha]_D^{24} + 1.9^\circ$ in EtOH- $CHCl_3$.

Double sulphate with epiquinine: $B_1, B_2, H_2SO_4, 6H_2O$: m.p. 101–3°. Decomp. at 115°. $[\alpha]_D^{20} + 38.5^\circ$ in H_2O .

Rabe, Höter, *J. prakt. Chem.*, 1940, 154, 66.

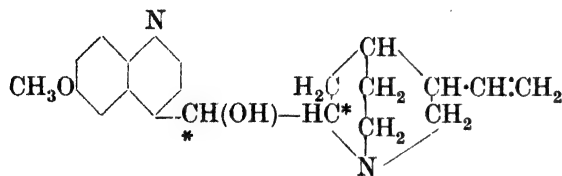
Rabe, Kindler, *Ber.*, 1939, 72, 263.

Suszko, Szelag, *Chem. Abstracts*, 1937, 13, 1816.

Dirscherl, Thron, *Ann.*, 1936, 521, 48.

Rabe, Kolbe, Hochstätter, *Ann.*, 1932, 492, 258.

Epiquinine

 $C_{20}H_{24}O_2N_2$

MW, 324

Differs from quinine in steric configuration at one of the carbon atoms marked *. Occurs in cinchona bark. Oil. $[\alpha]_D^{20} + 43.3^\circ$ in EtOH. Blue fluor. in H_2SO_4 .

B, 2HCl: cryst. from Me_2CO . M.p. 196° decomp. $[\alpha]_D^{21} + 33.3^\circ$ in EtOH.

B, HBr, 3H2O: m.p. 71–7°. $[\alpha]_D^{20} + 32.9^\circ$ in H_2O .

Dibenzoyl-d-tartrate: cryst. from Me_2CO . M.p. 160° decomp. $[\alpha]_D^{19} - 22.4^\circ$ (26.3°) in EtOH.

Double sulphate with epiquinidine: see under Epiquinidine.

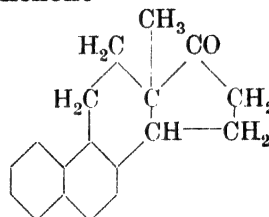
Rabe, Kindler, *Ber.*, 1939, 72, 263.

Rabe, Höter, *J. prakt. Chem.*, 1940, 154, 66.

Dirscherl, Thron, *Ann.*, 1936, 521, 48.

Rabe, Kolbe, Hochstätter, *Ann.*, 1932, 492, 258.

17-Equilenone

 $C_{18}H_{18}O$

MW, 250

Two forms (geometrical isomers).

(1) Plates from $MeOH-Me_2CO$. M.p. 100–1°.

Picrate: yellow needles from EtOH. M.p. 109.5–110.5°.

(2) Plates from $Me_2CO-EtOH$. M.p. 188.5–189.5°. Does not form a picrate.

Bachman, Wilds, *J. Am. Chem. Soc.*, 1940, 62, 2084.

 β -Equistanol $C_{30}H_{54}O$ ($C_{31}H_{56}O$)

MW, 430 (444)

Constituent of stallion's urine. Needles from $MeOH$. M.p. 133°. Sol. Et_2O, Me_2CO .

Acetyl: plates. M.p. 124°.

Marker, Lawson, Rohrmann, Wittle, *J. Am. Chem. Soc.*, 1938, 60, 1555.

Ergobasine.

See Ergometrine.

Ergobasineine.

See Ergometrineine.

Ergoclavine.

See under Ergosine.

Ergocristine

 $C_{35}H_{39}O_5N_5$

MW, 609

Alkaloid from ergot (*Claviceps purpurea*). Prisms + $1Me_2CO$ from Me_2CO . M.p. 155–7° decomp. $[\alpha]_D^{20}$ (Me_2CO free) – 183° in $CHCl_3$. Powerful action on uterus. Boiling $MeOH \rightarrow$ ergocristineine.

B, HCl: tablets from EtOH- Et_2O . $[\alpha]_{5461}^{20} + 126.5^\circ$, $[\alpha]_D^{20} + 105.7^\circ$, in EtOH.

Stoll, Burckhardt, *Z. physiol. Chem.*, 1937, 250, 1; 1938, 251, 287.

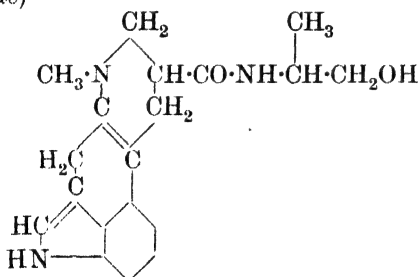
Ergocristinine $C_{35}H_{39}O_5N_5$

MW, 609

Alkaloid of ergot (*Claviceps purpurea*). Prisms from AcOEt. M.p. 214° decomp. $[\alpha]_D^{20} + 366^\circ$, $[\alpha]_{5461}^{20} + 460^\circ$, in $CHCl_3$. Little physiological action. Boil in 1% H_3PO_4 in EtOH \rightarrow ergocristine.

See previous references.

Ergometrine (*Ergobasine*, *ergonovine*, *ergotocine*, *ergostetrine*, *d-lysergic-d- β -hydroxyisopropylamide*)



Probable constitution

 $C_{19}H_{23}O_2N_3$

MW, 325

Alkaloid of ergot (*Claviceps purpurea*). Needles from C_6H_6 or prisms from methyl ethyl ketone (both with solvent), m.p. 162–3° decomp. Plates + $\frac{1}{2}$ AcOEt from AcOEt, m.p. 130–2° decomp. Needles from Me_2CO , m.p. 212° decomp. $[\alpha]_D^{20} + 91^\circ$ in H_2O , $[\alpha]_{5461}^{20} + 62.6^\circ$ in EtOH. Sol. MeOH, EtOH, AcOEt, Me_2CO . Spar. sol. C_6H_6 , CH_2Cl_2 . Prac. insol. $CHCl_3$. Darkens in air. Absorption maximum 3160 Å. Alk. hyd. \rightarrow lysergic acid + *d*- β -aminopropyl alcohol. Boil in MeOH \rightarrow ergometrinine. Induces powerful rhythmic contractions in quiescent uterus.

B, HCl: needles. M.p. 245–6° decomp. $[\alpha]_D^{25} + 63^\circ$ in H_2O .

B, HBr: needles. M.p. 236–7° decomp.

B_2(COOH)_2: needles. M.p. 193° decomp. $[\alpha]_D^{25} + 55.4^\circ$ in H_2O .

Picrate: hydrated: yellow needles, m.p. 148° decomp. Anhydrous: red prisms, decomp. at 188–9°.

l. (*l*-Lysergic-*l*- β -hydroxyisopropylamide).

Needles from C_6H_6 . M.p. 159–62° (corr.) decomp. $[\alpha]_D^{20} - 89^\circ$ in H_2O . No action on uterus.

Dudley, *Proc. Roy. Soc.*, 1935, B, 118, 478.

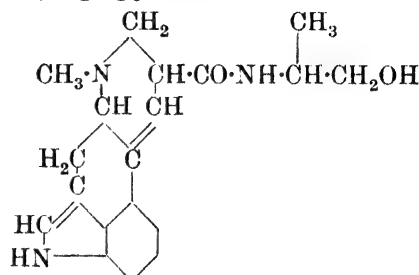
Stoll, Hofmann, *Z. physiol. Chem.*, 1938, 251, 155.

Craig, Shedlovsky, Gould, Jacobs, *J. Biol. Chem.*, 1938, 125, 289.

Jacobs, Craig, *J. Am. Chem. Soc.*, 1938, 60, 1701.

Thompson, *J. Am. Pharm. Assocn.*, 1935, 24, 748.

Ergometrinine (*Ergobasinine*, *d-isolysergic-d- β -hydroxyisopropylamide*)



Probable constitution

 $C_{19}H_{23}O_2N_3$

MW, 325

Alkaloid of ergot (*Claviceps purpurea*), isomeric with ergometrine. Prisms from Me_2CO . M.p. 195–7° decomp. $[\alpha]_{5461}^{20} + 520^\circ$ in $CHCl_3$, + 413° in MeOH. Only slight action on uterus. Acids or alkalis \rightarrow part. transformation to ergometrine.

B, HCl, H_2O: needles. M.p. 175–80° decomp.

B, HBr, H_2O: needles from Et_2O - Me_2CO . Aq. M.p. 130–90°.

B, HNO_3: prisms from MeOH- Et_2O . M.p. 235° decomp. $[\alpha]_D^{20} + 28.2^\circ$ in H_2O .

B, H_2SO_4: prisms. Decomp. at 250°.

B, HClO_4: needles. Decomp. at 225°.

l. (*l*-Isolysergic-*l*- β -hydroxyisopropylamide).

Prisms from Me_2CO . M.p. 196° (corr.) decomp. $[\alpha]_D^{20} - 415^\circ$ in $CHCl_3$.

Smith, Timmis, *J. Chem. Soc.*, 1936, 1166, 1440.

Stoll, Hofmann, *Z. physiol. Chem.*, 1938, 251, 155.

Craig, Shedlovsky, Gould, Jacobs, *J. Biol. Chem.*, 1938, 125, 289.

Jacobs, Craig, *J. Am. Chem. Soc.*, 1938, 60, 1701.

Ergonovine.

See Ergometrine.

Ergosine $C_{30}H_{37}O_5N_5$

MW, 547

Alkaloid of ergot (*Claviceps purpurea*). Prisms from AcOEt. M.p. 228° decomp. Sol. $CHCl_3$. Mod. sol. MeOH, Me_2CO . $[\alpha]_{5461}^{20} - 193^\circ$, $[\alpha]_D^{20} - 161^\circ$, in $CHCl_3$. $[\alpha]_D^{20} + 16^\circ$ in Me_2CO . Powerful action on uterus. Acids \rightarrow ergosinine. Mol. comp. with ergosinine (ergoclavine), m.p. 200° decomp.

B,HCl: plates + 1Me₂CO. M.p. 235° decomp.

B,HBr: needles + 1Me₂CO. Decomp. at 230°.

B,HNO₃: needles + 1Me₂CO. Decomp. at 215°.

Methiodide: decomp. at 215°.

Smith, Timmis, *J. Chem. Soc.*, 1937, 396.

Ergosinine

C₃₀H₃₇O₅N₅ MW, 547

Alkaloid of ergot (*Claviceps purpurea*), isomeric with ergosine. Prisms from EtOH, Me₂CO-Aq., C₆H₆ or AcOEt. Decomp. at 228°. Needles + ½ MeOH from MeOH. M.p. 220° decomp. [α]_D²⁰ + 522°, [α]_D²⁰ + 420°, in CHCl₃. [α]_D²⁰ + 475°, [α]_D²⁰ + 380°, in Me₂CO. Weak action on uterus. Acid hyd. → leucine. Heat. with H₃PO₄ in Me₂CO-EtOH → ergosine. Mol. comp. with ergosine, *see under* ergosine.

B,HCl: decomp. at 206°.

Smith, Timmis, *J. Chem. Soc.*, 1937, 396.

Ergostetrine.

See Ergometrine.

Ergotocine.

See Ergometrine.

Erysocine

C₁₈H₂₁O₃N MW, 299

Alkaloid with curare-like action isolated from several species of *Erythrina*. Needles from Et₂O. M.p. 162°. Sol. CHCl₃. Mod. sol. EtOH, Et₂O. [α]_D + 238.1°. Weakly basic.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, 62, 1677.

Erysodine

C₁₈H₂₁O₃N MW, 299

Alkaloid with curare-like action isolated from several species of *Erythrina*. Needles from EtOH. M.p. 204-5°. Sol. CHCl₃. Mod. sol. EtOH, Et₂O. [α]_D²⁷ + 248° in EtOH. Readily hyd. Weakly basic.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, 62, 1677.

Erysopine

C₁₇H₁₉O₃N MW, 285

Alkaloid with curare-like action isolated from several species of *Erythrina*. Cryst. from EtOH. M.p. 241-2°. Spar. sol. H₂O, CHCl₃ and hydroxylic solvents. [α]_D²⁵ + 265.2° in EtOH-glycerol. Aq. FeCl₃ containing drop of HCl

→ green col. Weak base. Unstable in alk. sol.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, 62, 1677.

Erysovine

C₁₈H₂₁O₃N MW, 299

Alkaloid with curare-like action isolated from several species of *Erythrina*. Prisms from Et₂O. M.p. 178-9°. Sol. CHCl₃. Mod. sol. EtOH, Et₂O. [α]_D + 252° in EtOH. Weak base.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, 62, 1677.

Erythraline

C₁₈H₁₉O₃N MW, 297

Alkaloid with curare-like action isolated from several species of *Erythrina*. Cryst. from EtOH. M.p. 106-7°. [α]_D²⁷ + 211.8° in EtOH.

B,HBr: cryst. from MeOH-Et₂O. M.p. 243°. [α]_D²⁷ + 216.6° in H₂O.

B,HI: yellow cryst. from EtOH. M.p. 252-3° decomp. [α]_D³¹ + 177° in H₂O.

Methiodide: yellow cryst. from MeOH-C₆H₆. M.p. 185-7°.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, 62, 436, 1673.

Erythramine

C₁₈H₂₁O₃N MW, 299

Alkaloid with curare-like action isolated from seeds of *Erythrina sandwicensis*, Deg. and *Erythrina subumbrans* (Hassk.) Merrill. Cryst. from Et₂O-pet. ether. M.p. 103-4°. B.p. 125°/3.9 × 10⁻⁴ mm. Sol. MeOH, EtOH, AcOEt, C₆H₆. Mod. sol. Et₂O. Prac. insol. pet. ether. Free base unstable.

B,HCl: cryst. from EtOH. M.p. 250° decomp.

B,HBr: needles from EtOH. M.p. 228°. [α]_D²⁶ + 203.2° in H₂O.

B,HI: yellowish orange needles from EtOH. M.p. 249° decomp. [α]_D²⁵ + 220° in H₂O.

Methiodide: yellowish plates. M.p. 96-8°. [α]_D²⁸ + 176° in H₂O.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1939, 61, 1232, 3053.

Erythratine

C₁₈H₂₁O₄N MW, 315

Alkaloid with curare-like action isolated from *Erythrina glauca*, Willd. Cryst. as hemihydrate from Et₂O-pet. ether. M.p. 170°. [α]_D²⁸ + 145.5° in EtOH.

B,HBr: cryst. from EtOH. M.p. 241°. [α]_D²⁸ + 158.7° in H₂O.

B,HI: cryst. from EtOH. M.p. 242°. $[\alpha]_D^{25-28} + 109.0^\circ$ in H_2O .

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, 62, 436.

Erythrene.

See 1:3-Butadiene.

Erythroglaucin.

See under Catenarin.

Erythroidine

$C_{16}H_{19}O_3N$ MW, 273

Alkaloid with curare-like action isolated from seeds of *Erythrina americana*, Mill. M.p. 94-6°. Sol. H_2O , MeOH, EtOH, $CHCl_3$, C_6H_6 . Mod. sol. Et_2O .

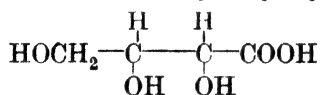
B,HCl: needles. M.p. 228-9° decomp. $[\alpha]_D^{21} + 109.7^\circ$ in H_2O .

Folkers, Major, *J. Am. Chem. Soc.*, 1937, 59, 1580.

Erythro-2-ketopentose.

See Adonose.

Erythronic Acid (Trihydroxybutyric acid)



$C_4H_8O_5$ MW, 136

Free acid readily sol. H_2O . Evaporation of aq. sol. \rightarrow lactone.

dl.

Brucine salt: cryst. M.p. 210° decomp. $[\alpha]_D^{20} - 33.8^\circ$ in H_2O .

Butyl ester: cryst. from Et_2O . M.p. 62-4°. $H(+Pt) \rightarrow$ erythritol.

Phenylhydrazide: cryst. from EtOH. M.p. 147-5°.

Triacetyl chloride: $C_{10}H_{16}O_7Cl$. B.p. 114-16°/2 mm.

Lactone: *dl*-erythronolactone. $C_4H_6O_4$. MW, 118. Cryst. from AcOEt. M.p. 91-2°. *Di-acetyl*: cryst. from H_2O . M.p. 52.5-53°.

d.

Brucine salt: cryst. from EtOH.Aq. M.p. 212-14°. $[\alpha]_D^{20} - 25.6^\circ$ in H_2O .

Quinine salt: needles from EtOH. M.p. 166°. $[\alpha]_D^{20} - 106.9^\circ$ in H_2O .

Strychnine salt: needles from H_2O or EtOH.Aq. M.p. 198-9°. $[\alpha]_D^{20} - 16.8^\circ$ in H_2O .

Amide: $C_4H_9O_4N$. MW, 135. Needles. M.p. 91-2°. $[\alpha]_D^{25} + 26.2^\circ$ in H_2O . *Tribenzoyl*: needles from 90% EtOH or 80% Me_2CO . M.p. 201°. $[\alpha]_D^{25} + 9.6^\circ$ in $CHCl_3$.

Lactone: *d*-erythronolactone. M.p. 104-5°. $[\alpha]_D^{20} - 73.2^\circ$ in H_2O . *Di-acetyl*: syrup. $[\alpha]_D^{25} - 50.6^\circ$ in 80% Me_2CO . *Dibenzoyl*: needles

from 90% MeOH. M.p. 110-11°. $[\alpha]_D^{25} - 176.9^\circ$ in $CHCl_3$.

l.

Brucine salt: prisms. Decomp. at 212°. $[\alpha]_D^{20} - 28.4^\circ$ in H_2O .

Amide: needles. M.p. 91-2°. $[\alpha]_D^{25} - 26.2^\circ$ in H_2O . *Tribenzoyl*: needles from 80% Me_2CO . M.p. 201°. $[\alpha]_D^{25} - 9.0^\circ$ in $CHCl_3$.

Lactone: *l*-erythronolactone. Needles from AcOEt. M.p. 105° corr. $[\alpha]_D + 73.0^\circ$ in H_2O . *Di-acetyl*: syrup. $[\alpha]_D^{25} + 50.7^\circ$ in 80% Me_2CO . *Dibenzoyl*: needles from 90% MeOH. M.p. 110-11°. $[\alpha]_D^{25} + 176.3^\circ$ in $CHCl_3$.

Glattfeld, Reitz, *J. Am. Chem. Soc.*, 1940, 62, 974.

Jelinek, Upson, *J. Am. Chem. Soc.*, 1938, 60, 355.

Glattfeld, Forbrich, *J. Am. Chem. Soc.*, 1934, 56, 1209.

Erythronolactone.

See under Erythronic Acid.

Eschscholtzxanthin

$C_{40}H_{54}O_2(\pm 2H)$ MW, 566 (± 2)

A xanthophyll occurring as esters in petals of *Eschscholtzia californica*. Red cryst. from Me_2CO . M.p. 185-6°. $[\alpha]_D^{25} + 225^\circ \pm 12^\circ$ in $CHCl_3$. $CHCl_3$ sol. with conc. $H_2SO_4 \rightarrow$ blue col. and with $SbCl_3$ purplish green. Unstable to heat. Absorbs oxygen from air. Absorption maxima at 4460, 4720 and 5030 Å in EtOH.

Di-acetyl: cryst. from CS_2 . M.p. 200-240° decomp. $[\alpha]_D^{20} + 132^\circ$ in $CHCl_3$.

Dibenzoyl: cryst. from Me_2CO -EtOH. M.p. 133°. $[\alpha]_D^{20} - 142^\circ$ in $CHCl_3$.

Di-p-nitrobenzoyl: cryst. from $CHCl_3$ - Me_2CO . M.p. above 260°. $[\alpha]_D^{20} - 234^\circ$ in $CHCl_3$.

Strain, *J. Biol. Chem.*, 1938, 123, 425.

Esculetin.

See Aesculetin.

Esculin.

See Aesculin.

Eseroline.

Phenylurethane: see Phen eserine.

Ethynylphenylcarbinol (*Acetylenylphenyl carbinol*, α -hydroxybenzylacetylene, 3-hydroxy-3-phenylallylene, 1-phenylpropinol-1)



C_9H_8O MW, 132

Prisms. M.p. 22°. B.p. 114°/12 mm. $D_4^{20} 1.0655$. $n_D^{20} 1.5508$.

Hg comp.: needles from EtOH. M.p. 167-8°. *Acetyl*: b.p. 124°/18 mm. $n_D^{20} 1.5155$.

Hydrogen phthaloyl: needles from petrol. M.p. 98–9°.

Phenylurethane: needles from pet. ether. M.p. 81–2°.

p-Nitrophenylurethane: pale yellow needles from xylene. M.p. 132°.

β-Naphthylurethane: needles from petrol. M.p. 120°.

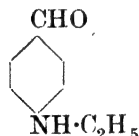
Campbell, Campbell, Eby, *J. Am. Chem. Soc.*, 1938, **60**, 2882.

Lespieau, *Bull. soc. chim.*, 1920, **39**, 991.

McCallum, U.S.P. 2,125,384, (*Chem. Zentr.*, 1938, II, 3005).

Jones, McCombie, *J. Chem. Soc.*, 1942, 734.

p-Ethylaminobenzaldehyde



$C_9H_{11}ON$ MW, 149

Needles from C_6H_6 -ligroin. M.p. 81–2°. Sol. EtOH, Et₂O, C_6H_6 . Mod. sol. hot H₂O.

Oxime: yellowish needles from C_6H_6 -pet. ether. M.p. 118°. Sol. EtOH, C_6H_6 .

Phenylhydrazone: yellow needles. M.p. 160° to turbid liq., clears at 182°.

Anil: red needles from C_6H_6 . Decomp. at 150°.

Ullmann, Frey, *Ber.*, 1904, **37**, 858.

Walter, D.R.P. 118,567, (*Chem. Zentr.*, 1901, I, 652).

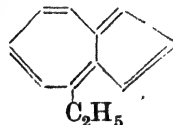
Ethyl p-aminophenyl sulphide.

See under p-Aminothiophenol.

Ethylaniline.

See also Amino-ethylbenzene.

4-Ethylazulene



$C_{12}H_{12}$ MW, 156

Oil.

Picrate: black needles from EtOH. M.p. 128–5°.

sym.-*Trinitrobenzene add. comp.*: m.p. 147–5°.

St. Pfau, Plattner, *Helv. Chim. Acta*, 1936, **19**, 877.

Ethyl 3-bromopropyl Ether.

See under 3-Bromopropyl Alcohol.

2-Ethylbutane-1 : 1-dicarboxylic Acid.

See sec.-n-Amylmalonic Acid.

Ethyl tert.-butyl sulphide.

See under tert.-Butyl Mercaptan.

1-Ethylbutyraldehyde.

See Diethylacetaldehyde.

1-Ethylbutyric Acid.

See Diethylacetic Acid.

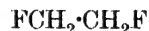
Ethyl-2-chloropropylcarbinol.

See 5-Chlorohexanol-3.

Ethylene dicyanide.

See Succinonitrile.

Ethylene difluoride (1 : 2-Difluoroethane)



$C_2H_4F_2$ MW, 66

B.p. 10–11°. Decomposes spontaneously. $Ca(OH)_2$ -Aq. slowly \rightarrow ethylene glycol.

Chabrie, *Compt. rend.*, 1890, **111**, 747.

Henne, Renoll, *J. Am. Chem. Soc.*, 1936, **58**, 890.

Ethylene Diglycol.

See 2 : 2'-Dihydroxydiethyl Ether.

Ethylene Thioglycol (*Mercaptoethyl alcohol*, *thioethylene glycol*, *hydroxyethyl mercaptan*, *1-hydroxy-2-mercaptoethane*, *thioglycol*)



C_2H_6OS MW, 78

B.p. 157–8°/742 mm. (slight decomp.), 55°/13 mm. Misc. with H₂O. D_4^{20} 1.1143. n_D^{20} 1.443.

Hg comp.: silvery plates from H₂O or EtOH. M.p. 123°. Sol. Me₂CO, AcOEt.

Pb comp.: orange plates from EtOH. M.p. 110°.

S-Me: C_3H_8OS . MW, 92. B.p. 80–5–81°/30 mm., 68–70°/20 mm. Misc. with H₂O. D_4^{20} 1.0640. n_D^{30} 1.4867.

S-Et: $C_4H_{10}OS$. MW, 106. B.p. 182–4°.

S-n-Butyl: $C_6H_{14}OS$. MW, 134. B.p. 92–3°/4 mm.

S-Isoamyl: $C_7H_{16}OS$. MW, 148. B.p. 110–11°/10 mm. D_4^{18} 0.948. n_D 1.475.

S-Phenyl: $C_8H_{10}OS$. MW, 154. B.p. 115–16°/2 mm. D_4^{20} 1.1451. n_D^{20} 1.5917.

S-o-Nitrophenyl: $C_8H_9O_3NS$. MW, 199. Dark yellow tablets. M.p. 100°.

S-m-Nitrophenyl: yellow needles from pet. ether or H₂O. M.p. 42–5°.

S-p-Nitrophenyl: yellow cryst. from Et₂O or CS₂. M.p. 62°.

S-2 : 4-Dinitrophenyl: $C_8H_6O_5N_2S$. MW, 244. Yellow needles from C_6H_6 . M.p. 100–5°.

Dibenzoyl: needles from EtOH. M.p. 39°.

S-Phenylurethane: cream cryst. from CCl₄ or C_6H_6 . M.p. 59–60°.

Bennett, Berry, *J. Chem. Soc.*, 1927, 1666.
 Fromm, Jörg, *Ber.*, 1925, **58**, 306.
 Bennett, *J. Chem. Soc.*, 1921, **119**, 423.
 Tseou, Pan, *J. Chinese Chem. Soc.*, 1939, **7**, 29.

Ethylethynylcarbinol (1-Pentynol-3)

$\text{C}_5\text{H}_8\text{O}$ MW, 84
 B.p. 125°. D_4^{25} 0.8926. n_D^{25} 1.4347.
 3 : 5-Dinitrobenzoyl : needles from 95% EtOH.
 M.p. 91°.

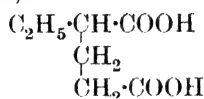
Hydrogen phthaloyl : prisms. M.p. 72°.

Kreimeier, U.S.P. 2,106,181, (*Chem. Abstracts*, 1938, **32**, 2547).

McCallum, U.S.P. 2,125,384, (*Chem. Zentr.*, 1938, II, 3005).

McGrew, Adams, *J. Am. Chem. Soc.*, 1937, **59**, 1497.

Lespiau, *Ann. chim.*, 1912, **27**, 170.

1-Ethylglutaric Acid (Pentane-1 : 3-dicarboxylic acid)

$\text{C}_7\text{H}_{12}\text{O}_4$ MW, 160
dl.

Cryst. from C_6H_6 -ligroin. M.p. 60.5° B.p. 250–60°, 194–6°/30 mm., 175°/11 mm. Sol. H_2O , EtOH, Et_2O , C_6H_6 . $k = 5.8 \times 10^{-5}$ at 25°.

Di-Et ester : $\text{C}_{11}\text{H}_{20}\text{O}_4$. MW, 216. B.p. 120–3°/11 mm. D_4^{22} 0.9946. n_D^{20} 1.4295.

Anhydride : $\text{C}_7\text{H}_{10}\text{O}_3$. MW, 142. B.p. 275°.

Mono-anilide : needles from EtOH.Aq. M.p. 154.5°.

Mono-p-toluidide : two forms. (1) M.p. 119–20°. (2) M.p. 145.5°.

Mono- β -naphthylamide : two forms. (1) M.p. 129.5°. (2) M.p. 142–3°.

d.

M.p. 42°. D_4^{20} (liq.) 1.173. $[\alpha]_D^{20}$ (liq.) + 16.5°, + 9.17° ($c = 3$) in H_2O .

Di-Me ester : $\text{C}_9\text{H}_{16}\text{O}_4$. MW, 188. B.p. 111°/16 mm. $[\alpha]_D^{20}$ + 14.6°.

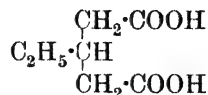
Anhydride : b.p. 147–8°/12 mm. $[\alpha]_D^{20}$ about + 23°.

Auwers, Titherley, *Ann.*, 1896, **292**, 144, 214.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, **83**, 769.

Berner, Leonardsen, *Ann.*, 1939, **538**, 39.

v. Braun, Mannes, Reuter, *Ber.*, 1933, **66**, 1502.

2-Ethylglutaric Acid (Isopentane-1 : 2'-dicarboxylic acid)

$\text{C}_7\text{H}_{12}\text{O}_4$ MW, 160

Prisms from CHCl_3 . M.p. 73°. Very sol. H_2O , EtOH, Et_2O .

Dinitrile : b.p. 144°/12 mm.

Anhydride : b.p. 158°/13 mm.

Day, Thorpe, *J. Chem. Soc.*, 1920, **117**, 1470.

Komnenos, *Ann.*, 1883, **218**, 167.

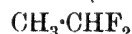
Blaise, Gault, *Bull. soc. chim.*, 1907, **1**, 90.

Ethyl hydroxyphenyl sulphide.

See under Thiohydroquinone and Thioresorcinol.

Ethylidene chloriodide.

See 1-Chloro-1-iodoethane.

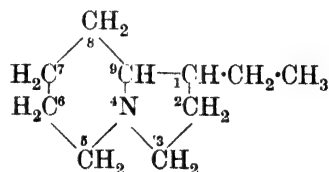
Ethylidene fluoride (1 : 1-Difluoroethane)

$\text{C}_2\text{H}_4\text{F}_2$ MW, 66

B.p. – 24.7°. Quite stable and practically inert chemically and physiologically.

I.G., D.R.P. 641,878, (*Chem. Zentr.*, 1937, I, 3714).

Henne, Renoll, *J. Am. Chem. Soc.*, 1936, **58**, 890.

1-Ethylindolizidine (1-Ethyl-octahydropyrrocoline)

$\text{C}_{10}\text{H}_{19}\text{N}$ MW, 153

B.p. 64°/11 mm.

Picrate : yellow needles from EtOH. M.p. 134°.

Picrolonate : rosettes of yellow needles. M.p. 176°.

Clemo, Metcalfe, *J. Chem. Soc.*, 1937, 1521.

2-Ethylindolizidine.

B.p. 41°/1 mm.

Picrate : yellow needles from EtOH. M.p. 149°.

Picrolonate : pale yellow needles. M.p. 161° slight decomp.

Methiodide : needles from Me_2CO . M.p. 232° decomp.

See previous reference.

Ethyl-lutidine.

See Dimethylethylpyridine.

Ethyloctahydropyrrocoline.

See Ethylindolizidine.

 α -Ethyl- β -phenylcinnamic Acid.

See 1 : 1 - Diphenyl - 1 - butylene - 2 - carboxylic Acid.

Ethyl α -piperidyl Ketone.

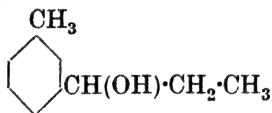
See Conhydrinone.

Ethylpropylacetylene.

See 3-Heptene.

5-Ethyl-2-pyrrolidone.See under 3-Amino-*n*-caproic Acid.***N*-Ethyl- α -quinolone.**

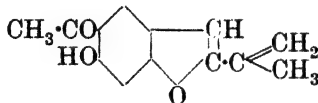
See under Carbostyryl.

Ethyl-*m*-tolylcarbinol (α -Hydroxy-*m*-propyltoluene, *m*-[α -hydroxypropyl]-toluene) $C_{10}H_{14}O$

MW, 150

B.p. 113–14°/12 mm. D_4^{20} 0.9833. n_D^{20} 1.521.Auwers, *Ann.*, 1919, **419**, 111.**Ethyl-*p*-tolylcarbinol** (α -Hydroxy-*p*-propyltoluene, *p*-[α -hydroxypropyl]-toluene).Cryst. M.p. 15°. B.p. 118–20°/23 mm. D_4^{25} 0.966.Acetyl : b.p. 130°/25 mm. D_4^{25} 0.989.

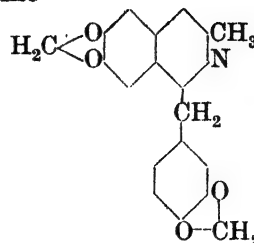
Phenylurethane : cryst. from pet. ether. M.p. 86–8°.

Klages, *Ber.*, 1902, **35**, 2252.**Euparin** $C_{13}H_{12}O_3$

MW, 216

Constituent of roots of *Eupatorium purpureum*. Yellow prisms from ligroin. Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. 8% NaOH.Aq. $FeCl_3 \rightarrow$ green col. in $EtOH$. Volatile in steam. Sublimes in vacuo.

Acetyl : prisms from ligroin. M.p. 80°.

Me ether : $C_{14}H_{14}O_3$. MW, 230. Needles from $EtOH$.Aq. M.p. 76–7°.*Oxime* : prisms from $EtOH$.Aq. M.p. 147–8°.*Semicarbazone* : yellow prisms from $AcOEt$. M.p. 255°.2 : 4-Dinitrophenylhydrazones : brown prisms from $AcOEt$. M.p. 252°.Kamthong, Robertson, *J. Chem. Soc.*, 1939, 925, 933.**Eupaverine** $C_{19}H_{15}O_4N$

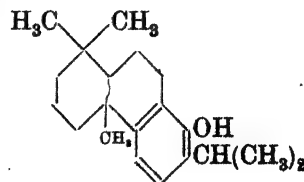
MW, 321

Colourless needles with blue fluor. from $MeOH$. M.p. 141°. Employed as substitute for papaverine. Salts used as antispasmodics and sedatives.*B, HCl* : yellowish prisms from $MeOH-Et_2O$. M.p. 254.5° decomp.*Chloraurate* : decomp. at 202°.Merck, E.P. 348,956, (*Chem. Zentr.*, 1931, II, 1196); D.R.P. 556,709, (*Chem. Zentr.*, 1932, II, 2847).Bruckner, Krámlí, *J. prakt. Chem.*, 1936, **145**, 291.**Europhene.**See 6-*tert*.-Butyl-*o*-cresol.**Evodin.**

See Limonin.

F**Fangchinoline.** (For formula see Tetrandrine). $C_{37}H_{40}O_6N_2$

MW, 608

Alkaloid isolated from the Chinese drug Han-Fang-Chi. Cryst. from $EtOH$ or Me_2CO . M.p. 237–8°. Alc. $FeCl_3 \rightarrow$ bluish-green col. $[\alpha]_D^{25} + 255.1^\circ$ in $CHCl_3$.*Mono-Me ether* : Tetrandrine, *q.v.**Et ether* : needles from $EtOH$.Aq. M.p. 116–17°. *Picrate* : yellow prisms from Me_2CO . M.p. 242° decomp.*Picrate* : cryst. from Me_2CO , m.p. 224° decomp. Cryst. from $EtOH$, m.p. 186° decomp.Chuang, Hsing, Kao, Chang, *Ber.*, 1939, **72**, 519.**Ferruginol** $C_{20}H_{30}O$

MW, 286

Constituent of resin of Miro tree, *Podocarpus ferrugineus*. B.p. 175°/0.3 mm. D_4^{21} 1.008. n_D^{21} 1.5346. $[\alpha]_D^{16} + 40.6^\circ$ in EtOH. Spar. sol. NaOH.Aq. $\text{FeCl}_3 \rightarrow$ green col. Se dehydrogenation \rightarrow pimanthrene and a hydroxyretene.

Me ether: $\text{C}_{21}\text{H}_{32}\text{O}$. MW, 300. B.p. 166°/0.3 mm. D_4^{21} 0.9868. n_D^{21} 1.5290.

Formyl: needles from pet. ether. M.p. 96–7°.

Acetyl: needles from pet. ether. M.p. 81–2°. $[\alpha]_D^{16} + 60.3^\circ$ in EtOH.

Benzoyl: needles from pet. ether. M.p. 154–5°.

Brandt, Neubauer, *J. Chem. Soc.*, 1939, 1031.

Ficusin.

See Psoralene.

Floribundine

$\text{C}_{18}\text{H}_{19}\text{O}_2\text{N}$ MW, 281

Alkaloid from *Papaver floribundum*. Prisms from Me_2CO . M.p. 193–5°. Sol. CHCl_3 . Spar. sol. EtOH, Et_2O . Conc. $\text{HNO}_3 \rightarrow$ violet col. which changes to yellow. $[\alpha]_D - 204.3^\circ$ in CHCl_3 .

Tartrate: needles from EtOH. M.p. 181–3°.

Methiodide: cryst. from EtOH. M.p. 178–80°.

Konowalowa, Yunusoff, Orechhoff, *Ber.*, 1935, 68, 2281.

Floripavine

$\text{C}_{21}\text{H}_{29}\text{O}_5\text{N}$ MW, 375

Alkaloid from *Papaver floribundum*. Prisms from EtOH or Me_2CO . M.p. 241–2°. Sol. CHCl_3 . Spar. sol. Et_2O , C_6H_6 . Conc. $\text{HNO}_3 \rightarrow$ violet col. which changes to yellow. $[\alpha]_D - 156^\circ$ in MeOH.

B,HCl: cryst. M.p. 209–10°.

Methiodide: needles from EtOH. M.p. 228–30°.

Konowalowa, Yunusoff, Orechhoff, *Ber.*, 1935, 68, 2281.

Floripavine

$\text{C}_{19}\text{H}_{21}\text{O}_4\text{N}$ MW, 327

Alkaloid from *Papaver floribundum*. Needles from EtOH. M.p. 200–1°. Sol. CHCl_3 . Spar. sol. Et_2O , C_6H_6 . $[\alpha]_D + 90.5^\circ$ in CHCl_3 . Turns brown in light.

B,HCl: needles from EtOH. M.p. 235–6°.

Picrate: yellow needles from EtOH. M.p. 223–4°.

Methiodide: needles from EtOH. M.p. 220–1°.

Konowalowa, Yunusoff, Orechhoff, *Ber.*, 1935, 68, 2282.

Fluorobromoethylene.

See Acetylene fluorobromide.

Fluorobutane.

See Butyl fluoride.

Fluorochloroethylene.

See Acetylene fluorochloride.

ω -Fluorotoluene.

See Benzyl fluoride.

Formylacetic Acid.

See Malonaldehydic Acid.

ω -Formylacetophenone.

See Benzoylacetalddehyde.

Formylacrylic Acid.

See Maleic Semi-aldehyde.

p-Formylbenzophenone.

See 4-Benzoylbenzaldehyde.

β -Formylbutyrophenone.

See 1-Benzoylbutyraldehyde.

3-Formylcamphor.

See 3-Hydroxymethylenecamphor.

7-Formylcaprylic Acid.

See Azelaic Semi-aldehyde.

p-Formylcinnamic Acid.

See 4-Aldehydocinnamic Acid.

Formyldiphenylamine.

See under Diphenylamine.

Formylisobutyric Acid.

See Aldehydoisobutyric Acid.

Formylmalonic Acid.

See Aldehydomalonic Acid.

Formylpropionic Acid.

See Aldehydopropionic Acid.

β -Formylpropiophenone.

See 1-Benzoylpropionaldehyde.

Formylsuccinic Acid.

See Aldehydosuccinic Acid.

Forsythigenol

$\text{C}_{21}\text{H}_{24}\text{O}_6$ MW, 372

Occurs in *Forsythia coreana*, Nakai, as glucoside forsythin. M.p. 132.5°. $\text{KMnO}_4 \rightarrow$ veratric and vanillic acids.

Mono-Me ether: m.p. 124°.

Kunimine, Suzuki, *J. Pharm. Soc. Japan*, 1938, 58, 572; 1937, 57, 902.

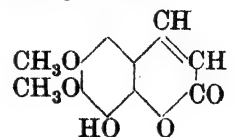
Forsythin

$\text{C}_{27}\text{H}_{34}\text{O}_{11}$ MW, 534

Constituent of *Forsythia coreana*, Nakai. Cryst. + $1\frac{1}{2}\text{H}_2\text{O}$. M.p. 181°. $[\alpha]_D^{27} + 46.4^\circ$ in EtOH. Hyd. \rightarrow forsythigenol + glucose.

See previous references.

Fraxidin (8-Hydroxy-6:7-dimethoxycoumarin, fraxetin 7-methyl ether)



$\text{C}_{11}\text{H}_{10}\text{O}_5$

MW, 222

Constituent of bark of ash. Cryst. from H_2O . M.p. 196–7°.

Späth, Jerzmanowska-Sienkiewiczowa, *Ber.*, 1938, **71**, 1831; 1937, **70**, 1019, 1672.

Freon (Difluorodichloromethane)



CCl_2F_2 MW, 121

Almost odourless gas. M.p. –155°. B.p. –29.8°. Spar. sol. H_2O . Employed as refrigerant.

Thompson, *Ind. Eng. Chem.*, 1932, **24**, 620.

Tanetic Chem., U.S.P. 2,005,709, (*Chem. Zentr.*, 1936, I, 2630).

General Motors, U.S.P. 1,990,692, (*Chem. Zentr.*, 1935, II, 436); U.S.P. 2,013,050, (*Chem. Zentr.*, 1936, I, 2630).

Friedelin

$\text{C}_{30}\text{H}_{50}\text{O}$ MW, 426

Triterpene ketone, containing a hydrogenated pentaacyclic structure, occurring in cork. Cryst. from AcOEt . M.p. 255–61°. $[\alpha]_{\text{D}}^{25} -29.4^\circ$. Fuming $\text{H}_2\text{SO}_4 \rightarrow$ red col.

Oxime: plates from $\text{AcOEt}-\text{C}_6\text{H}_6$. M.p. 290–4°.

p-Nitrophenylhydrazone: orange cryst. from C_6H_6 . M.p. 277–9°.

2:4-Dinitrophenylhydrazone: orange cryst. from C_6H_6 . M.p. 297–9° decomp.

Enol benzoate: leaflets from $\text{C}_6\text{H}_6-\text{AcOEt}$. M.p. 255–62°.

Enol phenylacetate: m.p. 244–51°.

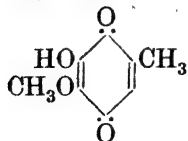
Drake, Jacobsen, *J. Am. Chem. Soc.*, 1935, **57**, 1570.

Drake, Shrader, *ibid.*, 1854.

Drake, Campbell, *J. Am. Chem. Soc.*, 1936, **58**, 1681.

Drake, Wolfe, *J. Am. Chem. Soc.*, 1940, **62**, 3018.

Fumigatin (6-Hydroxy-5-methoxytoluquinone)



$\text{C}_8\text{H}_8\text{O}_4$ MW, 168

Constituent of *Aspergillus fumigatus*, Freseus. Maroon coloured needles from pet. ether. M.p. 116°. Sol. EtOH , Et_2O , Me_2CO , AcOEt , C_6H_6 , CHCl_3 . Spar. sol. H_2O . Sol. NaOH . Aq. to purple sol. Alc. $\text{FeCl}_3 \rightarrow$ purple-black col. Sublimes in vacuo.

Me ether: $\text{C}_9\text{H}_{10}\text{O}_4$. MW, 182. Red needles from pet. ether. M.p. 59°.

Acetyl: yellow needles from pet. ether. M.p. 95–6°.

Raistrick, *Chemistry and Industry*, 1938, 293.

Anslow, Raistrick, *Biochem. J.*, 1938, **32**, 687, 2288.

Funiculosin

$\text{C}_{15}\text{H}_{10}\text{O}_5$ MW, 270

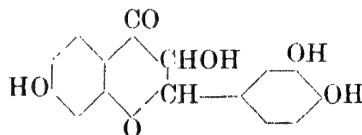
Isolated from *Penicillium funiculosum*, Thom. Dark red plates. M.p. 218°. Zn dust dist. \rightarrow anthracene + naphthalene.

Triacetyl deriv.: m.p. 205°.

Tribenzoyl deriv.: m.p. 277°.

Igarasi, *Journal of the Agricultural Chemical Society Japan*, 1939, **15**, 225, (*Chem. Abstracts*, 1939, **33**, 6296).

Fustin (*Dihydrofisetin*, 7:3':4'-trihydroxyflavonol, 3:7:3':4'-tetrahydroxyflavone)



$\text{C}_{15}\text{H}_{12}\text{O}_6$ MW, 288

Constituent of *Rhus cotinus* L., *Rhus succedanea* L., and *Rhus rhodanthema*. Colourless cryst. from H_2O . M.p. 216–18°. Sol. Et_2O , C_6H_6 , CHCl_3 . Sol. alkalis to red sols. $\text{FeCl}_3 \rightarrow$ green col. Reduces NH_3AgNO_3 , and hot Fehlings.

7:3':4'-Tri-Me ether: $\text{C}_{18}\text{H}_{18}\text{O}_6$. MW, 330. Needles from MeOH . M.p. 143–4°. *Acetyl*: prisms. M.p. 142–3°.

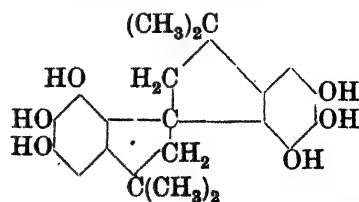
Tetra-acetyl: needles from EtOH . M.p. 150–51°.

Oyamada, *Ann.*, 1939, **538**, 44.

G

Gallacetonin

(Note: this name has been applied to the two compounds described below)



$\text{C}_{21}\text{H}_{24}\text{O}_6$

MW, 372

Cryst. from AcOH. Darkens at 240°. M.p. 260-5°.

Hexa-Me ether: pale yellow needles from EtOH. M.p. 135-7°.

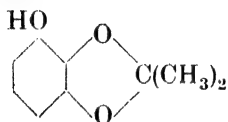
Hexa-acetyl: cryst. from EtOH or AcOH. M.p. 247° (rapid heat.).

Hexabenzoyl: m.p. 287-8°.

Hexabenzenesulphonyl: m.p. 213-16°.

Baker, Besly, *J. Chem. Soc.*, 1939, 199.

Wacek, Kratzl, *Oesterreichische Chemiker-Zeitung*, 1939, 42, 286, (*Chem. Abstracts*, 1940, 34, 1636).



$C_9H_{10}O_3$ MW, 166

Leaflets from H_2O . M.p. 89-90°. Very sol. EtOH, Et_2O , AcOH, C_6H_6 . Spar. sol. ligroin. Sol. alkalis.

Acetyl: prisms from pet. ether. M.p. 47-8°.

Benzoyl: cryst. from EtOH. M.p. 78°.

Benzenesulphonyl: cryst. from EtOH. M.p. 84°.

See second reference above.

Gansil.

See Chloramine-T.

Gazaniaxanthin

$C_{40}H_{56}O$ MW, 552

Carotenoid pigment from flowers of *Gazania rigens*. Brownish red cryst. + MeOH from MeOH-pet. ether. Loses MeOH at 80° in high vacuum. Deep red rectangular cryst. from C_6H_6 -MeOH (1 : 4). M.p. 136-7°. Absorption maxima at 5300, 4955, and 4630 Å in CS_2 .

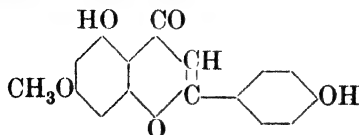
Acetyl: clusters of orange needles from C_6H_6 -MeOH. M.p. 83-5°. Absorption maxima at 5300 and 4940 Å in CS_2 .

Schön, *Biochem. J.*, 1938, 32, 1566.

Genistein.

β-Glucoside: see Sophoricoside.

Genkwanin (5 : 4'-Dihydroxy-7-methoxyflavone, apigenin 7-methyl ether)



$C_{16}H_{12}O_5$ MW, 284

Isolated from *Daphne genkwa* and from the Chinese drug "yuen-hua." Yellow needles from MeOH. M.p. 286°.

5-Me ether: $C_{17}H_{14}O_5$. MW, 298. Pale yellow needles from EtOH. M.p. 298°. *Acetyl*: needles from EtOH. M.p. 220°.

4'-Benzyl ether: m.p. 203°.

Diacetyl: needles from EtOH. M.p. 196°.

Dibenzoyl: needles from EtOH. M.p. 207-8°.

Mahal, Venkataraman, *J. Chem. Soc.*, 1936, 569.

Tseng, *J. Pharm. Soc. Japan*, 1935, 55, 30.

Nakano, Tseng, *J. Pharm. Soc. Japan*, 1932, 52, 148.

Geodin

$C_{17}H_{12}O_7Cl_2$ MW, 399

Metabolic product of *Aspergillus terreus*, Thom. Pale yellow needles from $CHCl_3$ - Et_2O . M.p. 235°. Sol. EtOH, AcOEt, Me_2CO , dioxan. Spar. sol. C_6H_6 . Insol. H_2O , pet. ether. $[\alpha]_{5461}^{20} + 179^\circ$ in $CHCl_3$. Alc. $FeCl_3 \rightarrow$ dirty green \rightarrow brown col. Heat. at 260° \rightarrow 2 : 6-dichloro-oreinol.

Tetra-Me ether: (of geodin + $1H_2O$) needles from MeOH. M.p. 150°.

Tetra-acetyl: (of geodin + $1H_2O$) plates from AcOH + 1% Ac_2O . M.p. 209-10°.

Calam, Clutterbuck, Oxford, Raistrick, *Biochem. J.*, 1939, 33, 579.

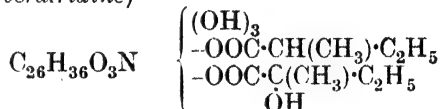
Clutterbuck, Koerler, Raistrick, *Biochem. J.*, 1937, 31, 1089.

Raistrick, Smith, *Biochem. J.*, 1936, 30, 1315.

Germanin.

See Bayer 205.

Germerine (*Methylethylglycollic acid ester of protoveratridine*)



$C_{36}H_{57}O_{11}N$ MW, 679

Alkaloid isolated from *Veratrum album*. Leaflets + $1H_2O$ from C_6H_6 . M.p. 193-5° (corr.) decomp. Very sol. MeOH, $CHCl_3$. Sol. EtOH. Me_2CO , AcOEt. Spar. sol. Et_2O . $[\alpha]_D^{20} + 10.8^\circ$ in $CHCl_3$. Very hygroscopic when anhydrous.

B,HCl: cryst. + $2H_2O$ from $CHCl_3$. M.p. 215° (corr.) decomp.

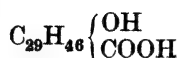
B,HBr: cryst. + $2H_2O$ from H_2O . M.p. 212-13° (corr.) decomp.

B,HSCN: plates + $1H_2O$ from EtOH.Aq. M.p. 221-3° (corr.) decomp.

Monopicrate: yellow cryst. + $1H_2O$ from Me_2CO - Et_2O . M.p. 186-7° (corr.) decomp.

Poethke, *Arch. Pharm.*, 1937, 275, 571.

Gledigenin



$C_{30}H_{48}O_3$ MW, 456

Mono-unsaturated sapogenin obtained from fruits of Chinese *Gleditsia*. Plates. M.p. 310° (corr.) decomp.

Et ester: needles. M.p. 203° corr. *Acetyl*: tablets. M.p. 184° corr.

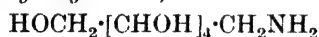
Acetyl: rods. M.p. 264° corr.

Benzoyl: scales. M.p. 217° corr.

Bromolactone: needles. M.p. 235° (corr.) decomp.

Fujii, Matsukawa, *J. Pharm. Soc. Japan*, 1935, 55, 1322.

Glucamine (*Pentahydroxy-1-aminohexane, pentahydroxyhexylamine*)



$C_6H_{15}O_5N$ MW, 181 d.

Amorphous solid from MeOH. M.p. 127-8°. Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O . $[\alpha]_D^{25} - 7.5^\circ$ in H_2O . Sweet taste. Strong base. Absorbs CO_2 from air and liberates NH_3 from ammonium salts. Does not reduce Fehling's. $NaOBr \rightarrow$ glucose. $HI + \text{red P at } 130^\circ \rightarrow$ 1-aminohexane. Stable to HCl at 125° or boiling conc. KOH.

$B_2H_2PtCl_6$: orange yellow prisms. M.p. 116-18°.

$B_2(COOH)_2$: plates from EtOH.Aq. M.p. about 180°.

O-Penta-acetyl: needles. M.p. 170°.

Hexa-acetyl: plates. M.p. 70°. B.p. 250°.

N-2: 4-Dinitrophenyl: m.p. 151-2°.

N-2: 4:6-Trinitrophenyl: yellow needles. M.p. 183°.

N-2: 4-Dinitronaphthyl: orange red needles. M.p. 189°.

Flint, Salzberg, U.S.P. 2,016,962, (*Chem. Abstracts*, 1935, 29, 8007).

Wayne, Adkins, *J. Am. Chem. Soc.*, 1940, 62, 3314.

Roux, *Ann. chim. phys.*, 1904, 1, 77.

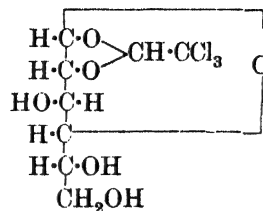
 α -Glucochloralose

$C_8H_{11}O_6Cl_3$ MW, 309.5
M.p. 187°.

Penta-acetyl deriv.: (1) m.p. 174°. $[\alpha]_D^{30} - 11.5^\circ$ in $CHCl_3$. (2) M.p. 151.5°. $[\alpha]_D^{30} + 66.2^\circ$ in $CHCl_3$.

White, Hixon, *J. Am. Chem. Soc.*, 1933, 55, 2438.

Pictet, Reichel, *Helv. Chim. Acta*, 1923, 6, 621.

 β -Glucochloralose (*Parachloralose, anhydro-glucochloral*)

Suggested formula

$C_8H_{11}O_6Cl_3$ MW, 309.5

M.p. 227-9°.

Triacetyl deriv.: m.p. 108°. $[\alpha]_D^{27} + 22.7^\circ$ in $CHCl_3$.

Penta-acetyl deriv.: m.p. 151°. $[\alpha]_D^{27} + 46.1^\circ$ in $CHCl_3$.

Tri-Me ether: $C_{11}H_{17}O_6Cl_3$. MW, 351.5. M.p. 109°.

Hixon *et al.*, *J. Am. Chem. Soc.*, 1933, 55, 2438; 1930, 52, 3191; 1929, 51, 519.

Glycerol.

Benzylidene ether: see Benzylidene-glycerol.

Glycylglycylalanine.

See Diglycylalanine.

Glycylglycyl-leucine.

See Diglycyl-leucine.

Glycylglycylvaline.

See Diglycylvaline.

Gmelinol

$C_{22}H_{26}O_7$ MW, 402

Constituent of the wood of *Gmelina leichhardtii* ("Colonial beech"). Plates or prisms from H_2O or EtOH. M.p. 124°. $[\alpha]_D + 123.3^\circ$ in $CHCl_3$.

Acetyl: prisms from EtOH. M.p. 118°. B.p. 320°/3 mm.

Phenylurethane: m.p. 189°.

Birch, Lions, *J. Proc. Roy. Soc. N.S. Wales*, 1938, 71, 391.

Harradence, Lions, *J. Proc. Roy. Soc. N.S. Wales*, 1940, 74, 117.

Gramine.

See Donaxine.

Gratiolone

$C_{30}H_{48}O_3$ MW, 456

Constituent of *Herba gratiola officinalis* (Hedge myssop). Probably a triterpene hydroxy-carboxylic acid. Needles from MeOH. M.p. 311-12°. Sublimes at 240-60°/15 mm. Sol. most org. solvents except pet. ether. $[\alpha]_D^{30} + 5.7^\circ$ in

Py. $C(NO_2)_4 \rightarrow$ yellow col. In CCl_4 absorbs Br \rightarrow bromolactone, m.p. 257°.

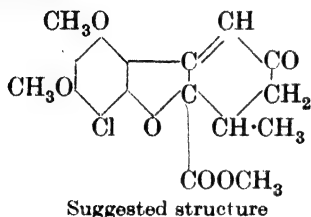
Me ester: m.p. 220°. $[\alpha]_D^{25} + 5.0^\circ$ in $CHCl_3$.
Acetyl: cryst. from MeOH. M.p. 197°.

Acetyl: needles from MeOH.Aq. M.p. 268°. $[\alpha]_D^{19} + 20.4^\circ$ in $CHCl_3$.

Retzlaff, *Arch. Pharm.*, 1902, **240**, 561.

Maurer, Meier, Reiff, *Ber.*, 1939, **72**, 1870.

Griseofulvin

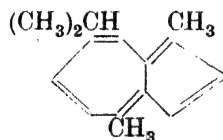


$C_{17}H_{17}O_6Cl$ MW, 352.5

Metabolic product of *Penicillium griseo-fulvum* Dierck. Cryst. from EtOH. M.p. 218–19°. Spar. sol. Me_2CO , AcOEt, $CHCl_3$, C_6H_6 , dioxan. Insol. H_2O . $[\alpha]_D^{19} + 417^\circ$ in Me_2CO , $[\alpha]_{5790}^{19} + 354^\circ$ in Me_2CO .

Oxford, Raistrick, Simonart, *Biochem. J.*, 1939, **33**, 240.

Guaiazulene (1 : 4-Dimethyl-7-isopropylazulene)



$C_{15}H_{18}$ MW, 198

Bluish violet plates from EtOH. M.p. 31.5°. B.p. 167–8°/12 mm. D_4^{19} 0.9728 (supercooled liq.). Absorption maxima in Et_2O or pet. ether: 6620, 6320, 6030, 5810, 5560 Å.

Picrate: black needles from EtOH. M.p. 122–122.5°. Stable only in presence of excess picric acid.

Styphnate: black needles from MeOH. M.p. 105–6°. Stable only in presence of excess styphnic acid.

sym.-*Trinitrobenzene add. comp.*: m.p. 151–151.5°.

sym.-*Trinitrotoluene add. comp.*: m.p. 89°.

Ruzicka, Rudolph, *Helv. Chim. Acta*, 1926, **9**, 134.

Birrell, *J. Am. Chem. Soc.*, 1934, **56**, 1248.

Ruzicka, Haagen-Smit, *Helv. Chim. Acta*, 1931, **14**, 1104.

Pfau, Plattner, *Helv. Chim. Acta*, 1936, **19**, 871.

Plattner, Lemay, *Helv. Chim. Acta*, 1940, **23**, 897.

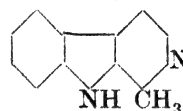
Perrottet, Taub, Briner, *Helv. Chim. Acta*, 1940, **23**, 1260.

Guanopterin.

See Isoguanine.

H

Harman (Aribine, loturine, 2-methylnorharman, 2-methyl-3-carboline)



$C_{12}H_{10}N_2$ MW, 182

Constituent of bark of Brazilian *Arariba rubra*, Mart. Cryst. from C_6H_6 , EtOH, or Et_2O . M.p. 238°. Sol. EtOH, MeOH, Et_2O , Me_2CO , $CHCl_3$. Spar. sol. ligroin, hot H_2O . Sol. min. acids with bluish violet fluor. Bitter taste. Sublimes. Forms cryst. salts with min. acids.

Späth, *Monatsh.*, 1920, **41**, 401.

Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1921, **119**, 1603, 1612.

Akabori, Saito, *Ber.*, 1930, **63**, 2245.

Späth, Lederer, *ibid.*, 120.

Helenalin

$C_{15}H_{18}O_4$ MW, 262

Occurs in *Helenium autumnale*. Rods from C_6H_6 . M.p. 167°. $[\alpha]_D^{20} - 101.9^\circ$ in EtOH. Bitter taste. Sternutator, vermifuge and mod. effective fish poison.

Acetyl: cryst. from MeOH.Aq. M.p. 184°.

Methoxyacetyl: hexagonal cryst. from MeOH.Aq. M.p. 135°.

Clark, *J. Am. Chem. Soc.*, 1936, **58**, 1982.

Heptadecane-1 : 1-dicarboxylic Acid.

See Cetylmalonic Acid.

Heptamethylene bromide.

See 1 : 7-Dibromoheptane.

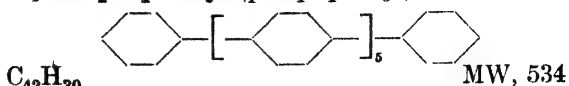
Heptamethylene chloride.

See 1 : 7-Dichloroheptane.

Heptandial.

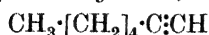
See Pimelic Dialdehyde.

p-Heptaphenyl (p-Septiphenyl)



M.p. 545°. Sublimes.

Busch, Weber, Mathauser, *J. prakt. Chem.*, 1936, **146**, 29.

1-Heptene (*Oenanthyldiene*, *n*-amylacetylene)
 C_7H_{12} MW, 96

F.p. below -70° . B.p. $99-100^\circ$ ($108-10^\circ$), $26^\circ/10$ mm. D_4^{20} 0.750. n_D^{20} 1.418. Red. \rightarrow *n*-heptane. $\text{NH}_3 \cdot \text{AgNO}_3 \rightarrow$ white ppt. $\text{NH}_3 \cdot \text{Cu}_2\text{Cl}_2 \rightarrow$ yellow ppt.

Moureu, André, *Ann. chim.*, 1914, **1**, 116 (Footnote).

Bourguel, *Ann. chim.*, 1925, **3**, 191, 325.

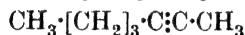
Bouis, *Ann. chim.*, 1928, **9**, 461.

Hill, Tyson, *J. Am. Chem. Soc.*, 1928, **50**, 172.

Chem. Fabrik Flörsheim, *Chem. Abstracts*, 1912, **6**, 2072.

Bodroux, *Compt. rend.*, 1939, **208**, 1022.

Vaughan, Hennion, Vogt, Niewland, *J. Org. Chem.*, 1937, **2**, 1.

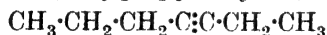
2-Heptene (*Methylbutylacetylene*)
 C_7H_{12} MW, 96

B.p. $111-13^\circ/750$ mm. ($111.5-112.5^\circ$). D 0.7632, D_4^{21} 0.748. n_D^{21} 1.4208. Heat with H_2O at $325^\circ \rightarrow$ methyl *n*-amyl ketone + ethyl *n*-butyl ketone.

Béhal, *Ann. chim.*, 1888, **15**, 427.

Desgrez, *Ann. chim.*, 1894, **3**, 234.

Gredy, *Compt. rend.*, 1933, **197**, 327.

3-Heptene (*Ethylpropylacetylene*)
 C_7H_{12} MW, 96

B.p. $105-6^\circ$ ($106-7^\circ$). D_4^{25} 0.7337. n_D 1.415. H_2SO_4 or $\text{HCl} \rightarrow$ butyrone. $\text{HgCl}_2 \rightarrow$ white ppt.

Lespieau, Wiemann, *Bull. soc. chim.*, 1929, **45**, 635.

Béhal, *Ann. chim.*, 1888, **75**, 415.

Faworski, *J. prakt. Chem.*, 1895, **51**, 558.

Bourguel, *Ann. chim.*, 1925, **3**, 191, 325.

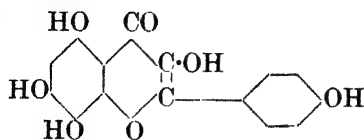
1-Heptene-1-aldehyde.

See Amylpropionic Aldehyde.

1-Heptene-1-carboxylic Acid.

See *n*-Amylpropionic Acid.

Herbacetin (3 : 5 : 7 : 8 : 4'-Pentahydroxyflavone)


 $\text{C}_{16}\text{H}_{10}\text{O}_7$ MW, 302

Aglucone of herbacitrin. Yellow cryst. + $1\text{H}_2\text{O}$ from $\text{EtOH} \cdot \text{Aq}$. M.p. $280-3^\circ$ ($279-81^\circ$). FeCl_3

\rightarrow dull green col. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ yellow col. with no fluor. Deep red ppt. with lead tetra-acetate.

Penta-acetyl: needles from EtOH . M.p. $192-3^\circ$ ($189-91^\circ$).

3 : 5 : 8 : 4'-*Tetra-Me ether*: $\text{C}_{19}\text{H}_{18}\text{O}_7$. MW, 358. Yellow cryst. from EtOH . M.p. $269-70^\circ$.

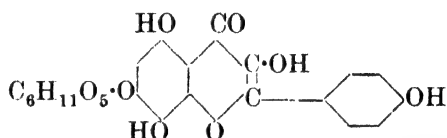
3 : 7 : 8 : 4'-*Tetra-Me ether*: yellow plates + $2\text{H}_2\text{O}$ from AcOH . M.p. anhyd. $160-2^\circ$. $\text{FeCl}_3 \rightarrow$ green col.

Penta-Me ether: $\text{C}_{20}\text{H}_{20}\text{O}_7$. MW, 372. Needles from $\text{MeOH} \cdot \text{Aq}$. M.p. $156-8^\circ$.

7-*Glucoside*: see Herbacitrin.

Goldsworthy, Robinson, *J. Chem. Soc.*, 1938, 56.

Ranagaswami, Rao, Seshadri, *Proceedings of the Indian Academy of Science*, 1939, **9A**, 133, (*Chem. Abstracts*, 1939, **33**, 5396).

Herbacitrin
 $\text{C}_{21}\text{H}_{20}\text{O}_{12}$ MW, 464

7-*Glucoside* of herbacetin. Pigment of the cotton flowers, *Gossypium herbaceum* and *G. indicum*. Yellow needles from $\text{Py} \cdot \text{Aq}$. M.p. $247-9^\circ$. Red ppt. with lead tetra-acetate. $\text{FeCl}_3 \rightarrow$ green col.

Octa-acetyl deriv.: colourless needles from Et_2O . M.p. $214-16^\circ$.

Rao, Seshadri, *Proceedings of the Indian Academy of Science*, 1939, **9A**, 365, (*Chem. Abstracts*, 1940, **34**, 107).

Neclakantam, Seshadri, *Proceedings of the Indian Academy of Science*, 1937, **5A**, 357, (*Chem. Abstracts*, 1937, **31**, 6246).

Hexadecyl Alcohol.

See Cetyl Alcohol.

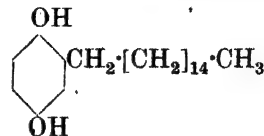
Hexadecyl bromide.

See Cetyl bromide.

Hexadecyl chloride.

See Cetyl chloride.

Hexadecylhydroquinone (2 : 5-Dihydroxyhexadecylbenzene, hexadecylquinol, cetylhydroquinone)


 $\text{C}_{22}\text{H}_{38}\text{O}_2$

MW, 334

Cryst. from pet. ether. M.p. 112°. Ag_2O → hexadecylbenzoquinone, m.p. 83°.

Di-Me ether: b.p. 210°/0.5 mm.

Di-Et ether: b.p. 219°/0.1 mm.

Cook, Heilbron, Lewis, *J. Chem. Soc.*, 1942, 660.

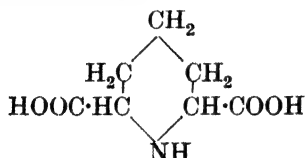
Hexadecyl iodide.

See Cetyl iodide.

Hexahydro-o-aminophenol.

See 2-Aminocyclohexanol.

Hexahydrodipicolinic Acid (*Piperidine-2 : 6-dicarboxylic acid*)



$\text{C}_7\text{H}_{11}\text{O}_4\text{N}$

MW, 173

Two forms. (1) Cryst. from H_2O . M.p. 281° decomp. Sol. H_2O . Spar. sol. EtOH. Prac. insol. Et_2O , C_6H_6 . (2) Plates + $1\text{H}_2\text{O}$ from H_2O or EtOH. Aq. Anhyd. at 134°. M.p. about 258°. Spar. sol. EtOH.

Di-Et ester: $\text{C}_{11}\text{H}_{19}\text{O}_4\text{N}$. MW, 229. B.p. 155–6°/11 mm. D_4^{25} 1.0748. n_D^{25} 1.4581.

Diamide: $\text{C}_7\text{H}_{13}\text{O}_2\text{N}_3$. MW, 171. Two forms corresponding to those of the acids. (1) Prisms from H_2O . M.p. 225–6° corr. Sol. hot H_2O , EtOH. (2) Leaflets + $1\text{H}_2\text{O}$. Anhyd. at 190°. M.p. 228–9° corr.

N-Me: see Scopolinic Acid.

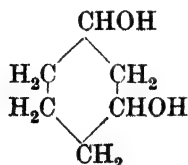
Singer, McElvain, *J. Am. Chem. Soc.*, 1935, 57, 1137.

Schmidt, *Ber.*, 1916, 49, 165.

Hess, *ibid.*, 2337.

Fischer, *Ber.*, 1901, 34, 2545.

Hexahydroresorcinol (*Cyclohexandiol-1 : 3, resorcitol*)



$\text{C}_6\text{H}_{12}\text{O}_2$

MW, 116

Cis.

Cryst. from AcOEt or Me_2CO . M.p. 86°. Sol. H_2O , EtOH. Spar. sol. Et_2O , pet. ether, C_6H_6 . Heat. of comb. 7.248 cal./gm.

Dibenzoyl: cryst. from MeOH or pet. ether. M.p. 65.5°.

Di-p-nitrobenzoyl: cryst. from AcOH. M.p. 154–5°.

Dict. of Org. Comp —II.

Di-phenylacetyl: b.p. 215–17°/1 mm. D_4^{25} 1.1235. n_D^{25} 1.5390.

Di-phenylurethane: cryst. from EtOH. M.p. 213°.

Di-α-naphthylurethane: cryst. from PhNO_2 . M.p. 245°.

Di-l-menthylurethane: cryst. from EtOH. M.p. 157°. $[\alpha]_D^{17.5}$ – 64.7° in EtOH.

Trans.

M.p. 117°. Heat. of comb. 7.232 cal./gm.

Diacetyl: b.p. 95°/0.4 mm.

Dibenzoyl: cryst. from AcOH, EtOH or pet. ether. M.p. 123.5°.

Di-p-nitrobenzoyl: cryst. from AcOH. M.p. 176.5°.

Di-phenylacetyl: needles from EtOH. M.p. 65°.

Lindermann, Baumann, *Ann.*, 1930, 477, 78.

Rothstein, *Ann. chim.*, 1930, 14, 474.

Coops, Dienske, Aten, *Rec. trav. chim.*, 1938, 57, 303.

Hexahydroxyditolyl.

See Leucopenicic.

Hexamethylene bromide.

See 1 : 6-Dibromohexane.

Hexamethylene chloride.

See 1 : 6-Dichlorohexane.

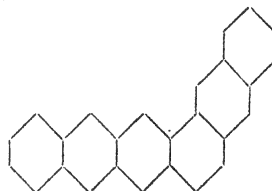
Hexane-1 : 2-dicarboxylic Acid.

See *n*-Butylsuccinic Acid.

Hexane-2 : 5-dicarboxylic Acid.

See 1 : 4-Dimethyladipic Acid.

Hexaphene



$\text{C}_{26}\text{H}_{16}$

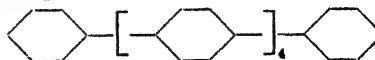
MW, 328

Yellow plates from xylene. M.p. 308°. Yellow fluor. in light. Sol. conc. H_2SO_4 with violet → brown → olive-green col. Spar. sol. low b.p. solvents. More sol. high b.p. solvents → sols. with greenish-blue fluor.

Clar, *Ber.*, 1940, 73, 81.

Clar, Wallenstein, Avenarius, *Ber.*, 1929, 62, 955.

p-Hexaphenyl (*p-Sexiphenyl*)



$\text{C}_{36}\text{H}_{26}$

MW, 458

Micro-plates from *o*-dichlorobenzene. M.p. 475°. Sublimes.

Pummerer, Bittner, *Ber.*, 1924, 57, 84.

Pummerer, Seligsberger, *Ber.*, 1931, 64, 2477.

Busch, Weber, Mathauser, *J. prakt. Chem.*, 1936, 146, 29.

3-Hexendione-2 : 5.

See 1 : 2-Diacetoethylene.

1-Hexinol-3.

See *n*-Propylethynylcarbinol.

Hexoestrol.

See Dihydrodiethylstilboestrol.

Hexogen.

See Cyclonite.

ψ -Hexylamine.

See 1-Amino-2-ethyl-*n*-butane.

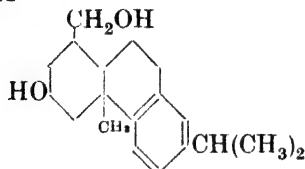
Hexyl bromide.

See Bromohexane.

Hinokinin.

See Cubebin.

Hinokiol



Suggested structure

$C_{19}H_{28}O_2$

MW, 288

Constituent of Hinoki wood (*Chamecyparis obtusa*, Sieb. et Zucc.). Prisms from EtOH. M.p. 234-5°. B.p. 240-7°/5 mm. part. decomp. $[\alpha]_D^{20} + 74.4^\circ$ in $CHCl_3$. $H_2SO_4 \rightarrow$ purple-red col.

Me ether: $C_{20}H_{30}O_2$. MW, 302. Needles. M.p. 95-6°. $[\alpha]_D^{20} + 59.5^\circ$ in EtOH.

Diacetyl: prisms. M.p. 143°. $[\alpha]_D^{24} + 70.4^\circ$ in EtOH.

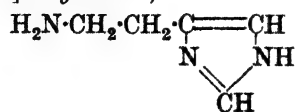
Dibenzoyl: prisms. M.p. 207°. $[\alpha]_D^{22} + 93.8^\circ$ in $CHCl_3$.

Di-phenylurethane: prisms. M.p. 246-7°.

Keimatsu, Ishiguro, *J. Pharm. Soc. Japan*, 1935, 55, 186.

Yoshiki, Ishiguro, *J. Pharm. Soc. Japan*, 1933, 53, 73.

Histamine (4-[ω -Aminoethyl]-glyoxaline, 2-[4-iminazolyl]-ethylamine)



$C_5H_9N_3$

MW, 111

Constituent of ergot.

B,2HCl: prisms from EtOH. M.p. 244-6°.

B,2HBr: needles. Darkens at 265°. M.p. 284°.

ω -*N-Benzoyl*: prisms from hot H_2O . M.p. 148°.

Picrate: m.p. 160-2°.

Di-picrate: m.p. 238-42° decomp. (241°).

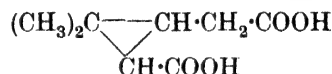
Picolonate: m.p. 262-4°.

Koessler, Hanke, *J. Am. Chem. Soc.*, 1918, 40, 1716.

Garforth, Pyman, *J. Chem. Soc.*, 1935, 489.

McHenry, *Physiological Reviews*, 1931, 11, 371.

Homocaronic Acid (3 : 3-Dimethyl-2-carboxymethylcyclopropane-carboxylic acid)



$C_8H_{12}O_4$

MW, 172

Cis-.

Needles from H_2O . M.p. 135-6° after sintering at 120°. Sol. toluene. Spar. sol. C_6H_6 , $CHCl_3$. Stable to Br in $CHCl_3$ or AcOH even on warming.

Di-phenylphenacyl ester: prisms from EtOH- Me_2CO . M.p. 147-9°.

Anhydride: b.p. 155-60°/17 mm.

Trans-.

Needles from H_2O . M.p. 191-2°. Less sol. H_2O than *cis*-form.

Owen, Simonsen, *J. Chem. Soc.*, 1933, 1226.

Simonsen, Rau, *J. Chem. Soc.*, 1923, 123, 556.

Guha, Sankaran, *Ber.*, 1937, 70, 1691.

Homocysteine (3-Mercapto-1-aminobutyric acid)



$C_4H_9O_2NS$

MW, 135

Intermediate in the metabolic conversion of methionine into cysteine.

dl-.

Cryst. from H_2O -EtOH. M.p. 232-3° corr. Ox. \rightarrow homocystine.

S-Benzyl: cryst. M.p. 240-50° corr. *N-Formyl*: plates from Me_2CO - C_6H_6 . M.p. 85-6° corr.

Thiolactone: *B,HCl*: cryst. from EtOH- Et_2O . M.p. 200-1°.

d-.

S-Benzyl: cryst. from H_2O . M.p. 247-52°

N-Benzoyl: leaflets from EtOH. M.p. 148–149.5°. *O-Acetyl*: needles from EtOH. Aq. M.p. 112–13°.

Wolfheim, *Ber.*, 1914, 47, 1444.
Kolshorn, *Ber.*, 1940, 37, 2482.
Rosenmund, D.R.P. 244,321, (*Chem. Zentr.*, 1912, I, 961).
Höchst, D.R.P. 193,634, (*Chem. Zentr.*, 1908, I, 430).

β -Hydroxy- α -aminoethylbenzene (2-Amino-2-phenylethyl alcohol, 2-hydroxy-1-phenylethylamine, 2-phenylethanolamine)



$\text{C}_8\text{H}_{11}\text{ON}$ MW, 137

Cryst. M.p. 50–60°. B.p. 261°. *B,HCl*: plates from EtOH–AcOEt. M.p. 137–8°, solidifying and remelting about 148°. *O-Benzoyl*: needles from EtOH. M.p. 154–154.5°. *B,HCl*: needles from H_2O . M.p. 205–205.5°. *Picrate*: needles. M.p. 188–9°. *O:N-Diacetyl*: cryst. from C_6H_6 . M.p. 103°. *Picrate*: prisms from H_2O . M.p. 207°.

Reihlen, Knöpfle, Sapper, *Ann.*, 1938, 534, 268.

Gabriel, Colman, *Ber.*, 1914, 47, 1867.

α -Hydroxy- β -aminopropylbenzene.

See Norephedrine and Nor- ψ -ephedrine.

Hydroxyaniline.

See Aminophenol.

4-Hydroxybenzophenone-3-carboxylic Acid.

See 5-Benzoylsalicylic Acid.

Hydroxybenzoylethyl Alcohol.

See 4- β -Dihydroxypropiophenone.

α -Hydroxybenzylacetylene.

See Ethinylphenylcarbinol.

1-Hydroxy-2-butylene.

See Crotyl Alcohol.

β -Hydroxy- γ -butyrottrimethylbetaine.

See Carnitine.

4-Hydroxy-3-chloromethylbenzoic Acid.

See α -Chloro-6-hydroxy-*m*-toluic Acid.

Hydroxyconiine.

See Conhydrine and ψ -Conhydrine.

Hydroxycycloheptane.

See Cycloheptanol.

2-Hydroxycyclohexanone.

See 2-Cyclohexanolone-1.

4-Hydroxycyclohexanone (4-Cyclohexanol-one-1).

B.p. 83–5°/0.6 mm.

Acetyl: b.p. 112–14°/11 mm.

Benzoyl: m.p. 63–4°. B.p. 142°/0.02 mm.
2:4-Dinitrophenylhydrazones: yellow needles from EtOH–AcOEt. M.p. 161°.

Semicarbazone: m.p. 182°.

2:4-Dinitrophenylhydrazones: cryst. from EtOH. M.p. 176°.

Aldersley, Burkhardt, Gillam, Hindley, *J. Chem. Soc.*, 1940, 13.

Dimroth, Schmeil, Daake, *Ber.*, 1942, 75, 321.

Hydroxycyclopentadecane.

See Cyclopentadecanol.

7-Hydroxy-2:5-diaminoacridine ethyl Ether.

Lactate: Rivanol.

Albert, Gledhill, *J. Soc. Chem. Ind.*, 1942, 61, 159.

Hydroxydiethylaniline.

See Diethylaminophenol.

8-Hydroxy-6:7-dimethoxycoumarin.

See Fraxidin.

Hydroxydimethylhexahydrobenzoic Acid.

See Dimethylcyclohexanol-carboxylic Acid.

Hydroxydimethylol- α -picoline.

See Adermin.

Hydroxydimethylpyrimidine.

See Dimethylpyrimidone.

α -Hydroxydiphenylethane.

See Phenylbenzylcarbinol.

Hydroxydocosane.

See Docosyl Alcohol.

Hydroxydurene.

See Durenol.

ω -Hydroxyemodin methyl Ether.

See Carviolin.

***N*-[β -Hydroxyethyl]-ethylenediamine**



$\text{C}_4\text{H}_{12}\text{ON}_2$ MW, 104

B.p. 238–40°/752 mm. Misc. with H_2O , EtOH. Spar. sol. Et_2O .

Chloroplatinate: yellow cryst. from H_2O . Decomp. at 249°.

Knorr, Brownsdon, *Ber.*, 1902, 35, 4470.

1-Hydroxyethyl *p*-hydroxyphenyl Ketone.

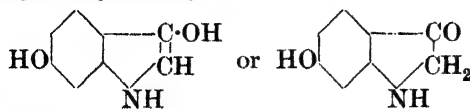
See 4- β -Dihydroxypropiophenone.

Hydroxyethyl Mercaptan.

See Ethylene Thioglycol.

Hydroxyethylnaphthalene.

See Naphthylethyl Alcohol.

6-Hydroxyindoxyl (3 : 6-Dihydroxyindole) $C_8H_7O_2N$

MW, 149

Dibenzoyl deriv. : prisms from EtOH. M.p. 136–7°.

Tutin, *J. Chem. Soc.*, 1910, **97**, 2515.

2-Hydroxyisobutylamine.

See Amino-*tert.*-butyl Alcohol.

Hydroxyisocarbostyryl.

See 1 : 4-Dihydroxyisoquinoline.

2-Hydroxyisopropylamine.

See 2-Aminopropyl Alcohol.

1-Hydroxy-2-mercaptoethane.

See Ethylene Thioglycol.

6-Hydroxy-7-methoxy-1 : 2 : 3 : 4-tetrahydroisoquinoline.

See Salsoline.

6-Hydroxy-5-methoxytoluquinone.

See Fumigatin.

***p* - [α - Hydroxy - β - methylaminoethyl] - phenol.**

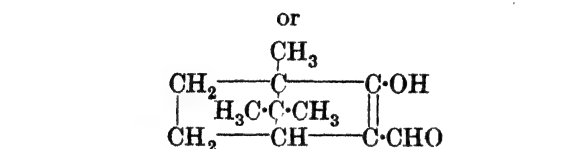
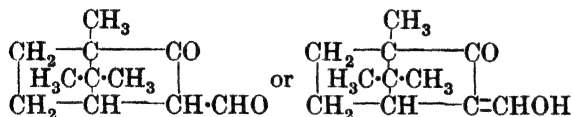
See Sympathol.

3-Hydroxy-3-methyl-1-butene.

See Dimethylethynylcarbinol.

4-Hydroxymethyl-dimethylaniline.

See *p*-Dimethylaminobenzyl Alcohol.

3-Hydroxymethylenecamphor (3-Formylcamphor, 3-aldehydocamphor, "camphoraldehyde") $C_{11}H_{16}O_2$

MW, 180

d.

Plates from 30% AcOH. Prisms from pet. ether. M.p. 81–2°. B.p. 251°, 105°/11 mm. Sol. EtOH, Et₂O, C₆H₆, CHCl₃, CS₂, hot H₂O, dil. alkalis, aq. NH₃, alkali carbonates. $[\alpha]_D^{20} + 198^\circ \rightarrow + 187^\circ$ in EtOH, after 20 hours. Volatile in steam. Alc. FeCl₃ → reddish violet col. Excess alc. FeCl₃ → bluish violet → blue → green col. Alk. KMnO₄ → camphoric acid. CrO₃-AcOH → camphorquinone.

Cu deriv. : $Cu(C_{11}H_{15}O_2)_2 + 2C_{11}H_{16}O_2$. Yel-

lowish green needles from ligroin. M.p. 126°.

$Cu(C_{11}H_{15}O_2)_2$: olive green needles. M.p. 166–7°.

Me ether : C₁₂H₁₈O₂. MW, 194. Prisms.

M.p. 40°. B.p. 262°, 141°/12 mm.

Et ether : C₁₄H₂₀O₂. MW, 208. B.p. 269–70°, 147–8°/17 mm.

Phenyl ether : b.p. 214–15°/13 mm.

Benzyl ether : cryst. M.p. 45–6°. B.p. 222–4°/16 mm.

Acetyl : cryst. from pet. ether. M.p. 63–4°.

Imino comp. : C₁₁H₁₇ON. Plates from CHCl₃-pet. ether. M.p. 164–5°.

Semicarbazone : cryst. from AcOH. M.p. 217–18°.

l.

Plates from petrol. M.p. 81–2°. $[\alpha]_D^{20} - 195^\circ \rightarrow - 185^\circ$ in EtOH, after 20 hours.

dl.

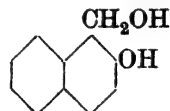
Cryst. from pet. ether. M.p. 80–1°.

Rupe, Sieberth, Kussmaul, *Helv. Chim. Acta*, 1920, **3**, 54.

Bishop, Claisen, Sinclair, *Ann.*, 1894, **281**, 331.

Pope, Read, *J. Chem. Soc.*, 1913, **103**, 446.

Palmén, *Chem. Abstracts*, 1930, **24**, 1636.

1-Hydroxymethyl-2-naphthol (ω : 2-Dihydroxy-1-methylnaphthalene, 2-hydroxy-1-naphthylcarbinol, 1-methylol-2-naphthol) $C_{11}H_{10}O_2$

MW, 174

Needles from CHCl₃. M.p. 188–9° decomp. Sol. EtOH. Alc. FeCl₃ → bluish green → brown col.

2-Me ether : C₁₂H₁₂O₂. MW, 188. Plates from H₂O. M.p. 100–1°.

Betti, Mundici, *Gazz. chim. ital.*, 1906, **36**, II, 659.

Jacobs, Heidelberger, *J. Biol. Chem.*, 1915, **20**, 671.

Clutterbuck, Cohen, *J. Chem. Soc.*, 1923, **123**, 2510.

Hydroxy-methylphthalic Acid.

See Coccinic Acid.

4-Hydroxymethyl-γ-resorcylic Aldehyde.

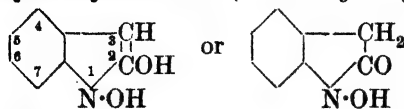
See Barbatol.

2-Hydroxy-1-naphthylcarbinol.

See 1-Hydroxymethyl-2-naphthol.

Hydroxynaphthylenediamine.

See Diaminonaphthol.

N-Hydroxyoxindole (1 : 2-Dihydroxyindole)C₃H₇O₂N MW, 149

Cryst. from H₂O. Mod. sol. AcOH, Me₂CO, hot EtOH. Spar. sol. Et₂O, C₆H₆. Sol. alkalis. FeCl₃ \rightarrow blue col.

1-*Me ether*: C₉H₉O₂N. MW, 163. Cryst. from H₂O. M.p. 88-5°.

1-*Acetyl*: needles from EtOH. Aq. M.p. 101°.

1-*Benzoyl*: cryst. from EtOH. M.p. 124-5°.

Reissert, *Ber.*, 1908, 41, 3926.

3-Hydroxy-3-phenylallylene.

See Ethinylphenylcarbinol.

Hydroxyphenylethylamine.

See Hydroxyaminoethylbenzene and Tyramine.

Hydroxyphenyl hydroxystyryl Ketone.

See Dihydroxychalkone.

Hydroxyphenyl hydroxytolyl Ketone.

See Dihydroxy-methylbenzophenone.

1-*p*-Hydroxyphenylisopropylamine.

See Paredrine.

21-Hydroxyprogesterone.

See Deoxycorticosterone.

5-Hydroxy-2-propylpiperidine.

See ψ -Conhydrine.

Hydroxypropyl-toluene.

See Ethyltolylcarbinol, Methylxylylcarbinol, and Tolypropyl Alcohol.

3-Hydroxy- γ -pyrone.

See Pyromeconic Acid.

Hydroxytetramethylbenzene.

See Durenol, Isodurenol, and Prehnitenol.

Hydroxythiophenetole.

See under Thiohydroquinone and Thioresorcinol.

Hydroxytoluidine.

See Aminocresol.

5-Hydroxy-1 : 2 : 3-trimethoxybenzene.

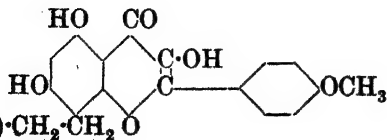
See Antiarol.

2-Hydroxytrimethylenediamine.

See 1 : 3-Diaminoisopropyl Alcohol.

Hydroxyundecane.

See cross references under Undecanol.

I**Icaritin**

(CH₃)₂C(OH)·CH₂·CH₂·O
C₂₁H₂₂O₇

MW, 386

Occurs as glycoside icariin in *Epimedium macranthum*. Yellow needles from EtOH. M.p. 239-5°.

Di-Me ether: yellow needles. M.p. 168-5°.

Tri-Me ether: needles from EtOH. M.p. 174°.

Phenylurethane: m.p. 213-14°.

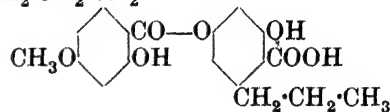
Triacetyl deriv.: needles. M.p. 210-12°.

Tetra-acetyl: needles. M.p. 145-146-5°.

Tetrabenzoyl: m.p. 184°.

Akai, Nakazawa, *J. Pharm. Soc.*Japan*, 1935, 55, 153, 788.

Akai, *ibid.*, 537.

Imbricaric AcidC₂₃H₂₈O₇

MW, 416

Isolated from the lichen, *Parmelia perlata*. Needles from C₆H₆. M.p. 125-6°. Alc. FeCl₃ \rightarrow violet col.

Me ester: *Di-Me ether*: needles from MeOH. M.p. 86-87-5°.

Asahina, Fujikawa, *Ber.*, 1935, 68, 634.

Asahina, Yosioka, *Ber.*, 1937, 70, 1823.

Iminazolyethylamine.

See Histamine.

2-Iminobutyronitrile.

See Diacetonitrile.

Iododecane.

See Decyl iodide.

 α -Iododinitrotoluene.

See Dinitrobenzyl iodide.

Iododocosane.

See Docosyl iodide.

Iodododecane.

See Dodecyl iodide.

Iodoheptadecane.

See Cetyl iodide.

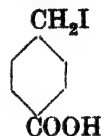
7-Iodo-8-hydroxyquinoline-5-sulphonic Acid.

See Loretin.

4-Iodomethyl-benzoic Acid.

See ω -Iodo-*p*-toluic Acid.

ω -Iodo-*p*-toluic Acid (4-Iodomethylbenzoic acid, *p*-carboxybenzyl iodide)

C₈H₇O₂I

MW, 262

Cryst. from Me_2CO . M.p. 335° .
Nitrile : see *p*-Cyanobenzyl iodide.

Knoll, D.R.P. 230,172 (*Chem. Zentr.*, 1911, I, 359).

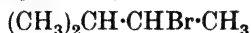
Iotone.

See 1 : 3-Di-iodoisopropyl Alcohol.

Isoacetoevernone.

See under 4 : 6-Dihydroxy-2-methylacetophenone.

sec.-Isoamyl bromide (3-Bromoisopentane, 3-bromo-2-methylbutane)



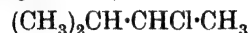
$\text{C}_5\text{H}_{11}\text{Br}$ MW, 151

B.p. 115.3° . n_D^{20} 1.4454. Readily isomerises.

Michael, Weiner, *J. Org. Chem.*, 1939, 4, 531.

Walling, Kharasch, Mayo, *J. Am. Chem. Soc.*, 1939, 61, 2693.

sec.-Isoamyl chloride (3-Chloroisopentane, 3-chloro-2-methylbutane)



$\text{C}_5\text{H}_{11}\text{Cl}$ MW, 106.5

B.p. $90-3^\circ$. D_4^{15} 0.8752.

Aschan, *Chem. Zentr.*, 1918, II, 939.

Isoandrosterone.

See *trans*-Androsterone.

Isoantipyrine.

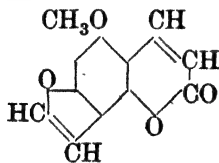
See 1 : 2-Dimethyl-3-phenylpyrazolone-5.

Isoapocaffeine.

See under Caffolide.

Isoauropten.

See under Auropten.

Isobergapten

$\text{C}_{12}\text{H}_8\text{O}_4$ MW, 216

Coumarin present in roots of *Heracleum sphondylium*, Linn., and *Pimpinella saxifraga*. Cryst. from EtOH. M.p. 222° ($217-19^\circ$).

Wessely, Nadler, *Monatsh.*, 1932, 60, 142.

Späth, Simon, *Monatsh.*, 1936, 67, 349.

Späth, Kubiczek, *Ber.*, 1937, 70, 1253.

Isobutyl-active-amylcarbinol.

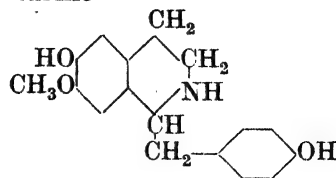
See 2 : 6-Dimethyloctanol-4.

Isobutylisoamylcarbinol.

See 2 : 7-Dimethyloctanol-4.

Isocaryophyllene.

See γ -Caryophyllene.

Isococclaurine

$\text{C}_{17}\text{H}_{19}\text{O}_3\text{N}$ MW, 285

Alkaloid occurring to small extent in commercial *Radix pareiræ bravæ*. Plates from MeOH. M.p. $216-17^\circ$. MeOH sol. + $\text{FeCl}_3 \rightarrow$ reddish col. Gives Millon reaction. Forms spar. sol. nitrate.

B.HCl: plates + $1\text{H}_2\text{O}$ from H_2O . M.p. $175-6^\circ$. $[\alpha]_{D}^{20} + 23.9^\circ$ in H_2O .

King, *J. Chem. Soc.*, 1940, 744.

Isoindole.

See 2 : 5-Diphenylpyrazine.

Isolariciresinol.

See under Lariciresinol.

Isolicanic Acid.

See β -Couepic Acid.

Isolobinine

$\text{C}_{18}\text{H}_{25}\text{O}_2\text{N}$ MW, 287

Alkaloid from *Lobelia inflata*. Cryst. from Et_2O -pet. ether. M.p. 78° . $\text{CrO}_3 \rightarrow$ acetic and benzoic acids.

B.HCl: cryst. + $1\text{H}_2\text{O}$. M.p. 132° , anhyd. 154° . $[\alpha]_D^{20} - 76^\circ$ in H_2O . Oxime: m.p. 186° .

Phosphate: m.p. 80° . Decomp. in moist air.

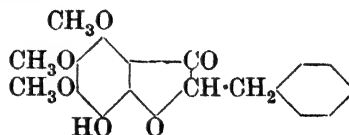
Thomä, *Ann.*, 1939, 540, 99.

Isonaphthazarin.

See 2 : 3-Dihydroxy-1 : 4-naphthoquinone.

 α -Isonitrosophenylacetic Acid.

See under Benzoylformic Acid.

Isopedicin

$\text{C}_{18}\text{H}_{18}\text{O}_6$ MW, 330

Colouring matter of the leaves of *Didymocarpus pedicellata*. Yellow rods and needles from $\text{AcOEt}-\text{Et}_2\text{O}$. M.p. 105° . Dil. alkalis \rightarrow pedicin. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ red col. Alc. $\text{FeCl}_3 \rightarrow$ red \rightarrow brown col.

Sharma, Siddiqui, *J. Indian Chem. Soc.*, 1939, 16, 1.

Salimuzzaman, Siddiqui, *J. Indian Chem. Soc.*, 1937, 12, 703.

Isopentane-1 : 1-dicarboxylic Acid.

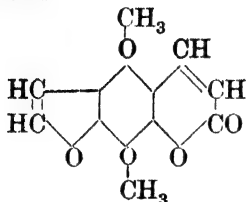
See *sec.*-Butylmalonic Acid.

Isopentane-1 : 2'-dicarboxylic Acid.

See 2-Ethylglutaric Acid.

Isopentylamine.See 4-Amino-2-methyl-*n*-butane.**Isopeanol.**

See Isopæanol.

Isophthalic Acid.Amide-nitrile: see under *m*-Cyanobenzoic Acid.**Isopimpinellin**

Suggested structure

 $C_{13}H_{10}O_5$

MW, 246

Coumarin present in roots of *Pimpinella saxifraga*, and *Heracleum sphondylium*, Linn. Yellow cryst. from MeOH. M.p. 151° (147-9°).

Wessely, Kallab, *Monatsh.*, 1932, **59**, 168.Späth, Simon, *Monatsh.*, 1936, **67**, 350.**Isopropanolamine.**

See Aminoisopropyl Alcohol.

Isopropenylcarbinol.

See 2-Methylallyl Alcohol.

Isopropenyltoluene.

See Tolypropylene.

***p*-Isopropylbenzanilide.**See under *p*-Cumidine.**4-Isopropyl-*o*-cresol.**

See Carvacrol.

4-Isopropyl-*m*-cresol.

See Thymol.

Isopropylcyclopropane - 1 : 2 - dicarboxylic Acid.

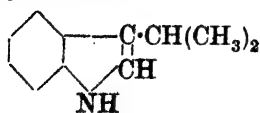
See Umbellularic Acid.

Isopropylethinylcarbinol (4-Methyl-1-pentinol-3) $C_6H_{10}O$

MW, 98

B.p. 131-2°. D_4^{20} 0.8779. n_D^{20} 1.43569.Krestinski, Kelbowskaja, *Ber.*, 1931, **64**, 2371.Krestinski, Marjin, *Ber.*, 1927, **60**, 1866.**Isopropylidene chloriodide.**

See 2-Chloro-2-iodopropane.

3-Isopropylindole $C_{11}H_{13}N$

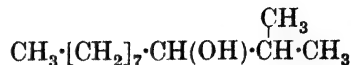
MW, 159

B.p. 155-60°/20 mm.

Picrate: red needles. M.p. 102-3°.

Cornforth, Robinson, *J. Chem. Soc.*, 1942, 682.**Isopropylisohexylcarbinol.**

See 2 : 7-Dimethyloctanol-3.

Isopropyloctylcarbinol (2-Methylundecanol-3) $C_{12}H_{26}O$

MW, 186

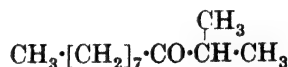
*d*l.B.p. 135°/26 mm. D_4^{20} 0.8327. n_D^{20} 1.4405. $[\alpha]_D^{20} + 18.55^\circ$, $+ 21.50^\circ$ in EtOH.

Hydrogen phthaloyl: needles. M.p. 47-8°. $[\alpha]_D + 17.2^\circ$ in EtOH. Strychnine salt: cryst. from Me₂CO. M.p. 174-5°. $[\alpha]_D - 19.9^\circ$ in CHCl₃.

dl.

B.p. 236°.

Hydrogen phthaloyl: cryst. from pet. ether. M.p. 55°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, 101, 633.**Isopropyl octyl Ketone (2-Methylundecanone-3)** $C_{12}H_{24}O$

MW, 184

B.p. 232-5°. D_4^{18} 0.8286.Pickard, Kenyon, *J. Chem. Soc.*, 1912, 101, 629.**4-Isopropylresorcinol.**

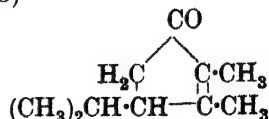
See 2 : 4-Dihydroxycumene.

Isopropyltoluene.

See Cymene.

Isopropylveratrol.

See under 3 : 4-Dihydroxycumene.

Isothujone (1 : 2-Dimethyl-5-isopropylcyclopentenone-3) $C_{10}H_{16}O$

MW, 152

B.p. 224-8°, 89°/13 mm. n_D^{19} 1.4641. $[\alpha]_D^{19} + 12.72^\circ$.

Oxime: m.p. 117°.

Semicarbazone: m.p. 155-6°. $[\alpha]_D^{16} + 55^\circ$ in MeOH.

2 : 4-Dinitrophenylhydrazone : dark red cryst.
M.p. 137.5°. $[\alpha]_D^{18} + 31^\circ$ in CHCl_3 .

Short, Read, *J. Chem. Soc.*, 1939, 1040.
Guha, Kuppasami, *J. Indian Inst. Sci.*,
1939, 22A, 249, (*Chem. Abstracts*, 1940,
34, 3255).

J

Jacobine

$\text{C}_{18}\text{H}_{25}\text{O}_6\text{N}$ MW, 351

Alkaloid of common ragwort (*Senecio jacobaeae*, Linn.) and of *S. cineraria*, D.C. Plates from EtOH. M.p. 219°. $[\alpha]_D^{17} - 46.3^\circ$ in CHCl_3 . Hyd. \rightarrow retronecine + jaconecic acid, $\text{C}_{10}\text{H}_{16}\text{O}_6$, needles, m.p. 182°.

B, HNO_3 : plates from EtOH. M.p. 234°. $[\alpha]_D^{17} - 28.6^\circ$ in H_2O .

Methiodide : prisms from EtOH. M.p. 255°.

Picrate : needles from EtOH. M.p. 180°.

Barger, Blackie, *J. Chem. Soc.*, 1937, 584.

Jacodine

$\text{C}_{18}\text{H}_{25}\text{O}_5\text{N}$ MW, 335

Alkaloid from *Senecio jacobaeae*, Linn. Plates from AcOEt. M.p. 217°. $[\alpha]_D^{17} - 109.6^\circ$ in CHCl_3 . Hyd. \rightarrow retronecine + an acid.

Nitrate : m.p. 215°. $[\alpha]_D^{17} - 77.4^\circ$ in H_2O .

Picrate : needles from AcOEt. M.p. 171°.

Barger, Blackie, *J. Chem. Soc.*, 1937, 584.

Jaconine

$\text{C}_{18}\text{H}_{25}\text{O}_8\text{N}$ MW, 383

Alkaloid from *Senecio jacobaeae*, Linn. Prisms + H_2O from EtOH.Aq. M.p. 146°. B.p. 180°/0.01 mm.

Barger, Blackie, *J. Chem. Soc.*, 1937, 584.

Jervine

$\text{C}_{26}\text{H}_{37}\text{O}_9\text{N}$ MW, 411

Alkaloid of white hellebore (*Veratrum grandiflorum*) and *Veratrum album*. Needles + $2\text{H}_2\text{O}$ from EtOH.Aq. M.p. 240-1°. $[\alpha]_D^{19} - 177.5^\circ$ in EtOH.

B, HCl : prisms from EtOH. M.p. 308°.

$\text{B}, \text{CCl}_3\text{-COOH}$: m.p. 243-4°.

Di-p-bromobenzoyl : m.p. 280-2°.

N-Nitroso : m.p. 246-7°.

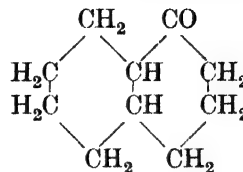
Poethke, *Arch. Pharm.*, 1938, 276, 170.

Saito, Sugimoto, Takaoka, *Bull. Chem. Soc. Japan*, 1934, 9, 15.

K

Ketocyclopentene.

See Cyclopentenone.

1-Ketodecahydronaphthalene (α -Decalone)

$\text{C}_{10}\text{H}_{16}\text{O}$ MW, 152

Cis-.

M.p. 2°. B.p. 126°/20 mm. D_4^{20} 1.008. n_D^{20} 1.4936.

Oxime : deriv. of trans-form is obtained.

Semicarbazone : m.p. 220-21° decomp.

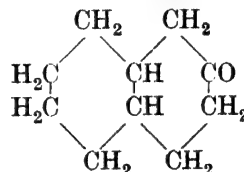
Trans-.

M.p. 33°. B.p. 122°/20 mm. D_4^{20} 0.986. $n_D^{21.5}$ 1.4849.

Oxime : m.p. 168°.

Semicarbazone : m.p. 229-30°.

Hückel, *Ann.*, 1925, 441, 1.

2-Ketodecahydronaphthalene (β -Decalone)

$\text{C}_{10}\text{H}_{16}\text{O}$ MW, 152

Cis-.

M.p. -14°. B.p. 247°, 128°/26 mm. D_4^{20} 1.0038. n_D^{20} 1.4926.

Oxime : b.p. 161-5°/16 mm.

Semicarbazone : m.p. 182-3° decomp.

Trans-.

M.p. 6°. B.p. 241°, 126°/30 mm., 117°/16 mm. D_4^{20} 0.975. n_D^{19} 1.4809.

Oxime : m.p. 76°.

Semicarbazone : m.p. 192-3° decomp.

Hückel, *Ann.*, 1925, 441, 1.

Cook, Lawrence, *J. Chem. Soc.*, 1937, 824.

Ketodimethylcaproic Acid.

See 1-Butyrylisobutyric Acid and Dimethylacetobutyric Acid.

2-Keto-1-ethylcaproic Acid.

See 1-Butyrylbutyric Acid.

Ketohehexahydrobenzoic Acid.

See Cyclohexanone-carboxylic Acid.

Ketomethylcaproic Acid.

See 1-Butyrylpropionic Acid and 2-Methyl-3-acetobutyric Acid.

2-Ketohexamethyleneimine.See under 5-Amino-*n*-caproic Acid.**Kobusine** $C_{20}H_{27}O_2N$ MW, 313

Alkaloid present in *Aconitum sachalinense*, Fr. Schmidt. Prisms or plates from EtOH.Aq. M.p. 268°. $[\alpha]_D^{25} + 83.61^\circ$ in $CHCl_3$. Conc. $H_2SO_4 \rightarrow$ yellow col.

B, HBr: cryst. + $1H_2O$. M.p. 285° decomp. $[\alpha]_D^{25} + 40.7^\circ$ in H_2O .

B, HCl: decomp. at 300°. $[\alpha]_D^{21} + 41.4^\circ$ in H_2O .

Perchlorate: m.p. 220° decomp.

Chloroplatinate: prisms from EtOH. Darkens at 262°.

Diacetyl: m.p. 139–40°.

Picrate: yellow cryst. M.p. 277°.

Methiodide: m.p. 287° decomp.

Suginome, Simamonti, *Ann.*, 1940, 545, 220.

L**Lactucerin.**

See under Lactucanol.

 α -Lactucanol $C_{30}H_{50}O$ MW, 426

Occurs as isovalerate in latex of *Calotropis procera* and as acetate in resin (lactucarium) of *Lactuca virosa*. Needles from EtOH. M.p. 224.5°. $[\alpha]_D^{20} + 97.5^\circ$ in $CHCl_3$. Conc. $H_2SO_4 + Ac_2O \rightarrow$ red \rightarrow violet \rightarrow green col.

Acetyl: α -lactucerin. Leaflets. M.p. 252° (239–40°).

Isovaleryl: cryst. from EtOH. M.p. 181°.

Benzoyl: leaflets from MeOH-Me₂CO. M.p. 257°.

Hesse, Eilbracht, Reicheneder, *Ann.*, 1941, 546, 233.

Bauer, Brunner, *Arch. Pharm.*, 1938, 276, 605.

 β -Lactucanol $C_{30}H_{50}O$ MW, 426

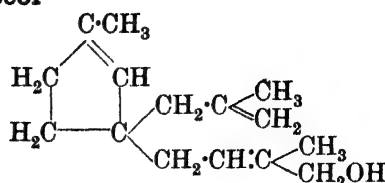
Occurs as acetate in resin (lactucarium) of *Lactuca virosa*. Needles from Me₂CO. M.p. 178–80°. $[\alpha]_D^{20} + 50.8^\circ$ in $CHCl_3$.

Acetyl: β -lactucerin. Needles from Me₂CO. M.p. 231–2°.

Benzoyl: leaflets from Me₂CO. M.p. 222–4°.

p-Bromobenzoyl: leaflets from Me₂CO. M.p. 208–10°.

Bauer, Brunner, *Arch. Pharm.*, 1938, 276, 605.

Lanceol $C_{15}H_{24}O$ MW, 220

Sesquiterpene alcohol from oil of *Santalum lanceolatum*. B.p. 175–6°/17 mm. $D_4^{25} 0.9474$. $n_D^{25} 1.5074$. $[\alpha]_{5461} - 77.4^\circ$, $[\alpha]_{5780} - 67.8^\circ$.

Allophanate: needles from EtOH. M.p. 114–15°.

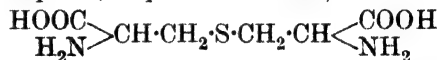
Bradfield, Francis, Penfold, Simonsen, *J. Chem. Soc.*, 1936, 1619.

Lanigerin $C_{17}H_{14}O_5$ MW, 298

Pigment from wax of the woolly aphis (*Eri-soma lanigerum*). Orange plates from Et₂O. M.p. 274–6° decomp. Et₂O and AcOH \rightarrow orange-red sols. with green fluor.

Blount, *J. Chem. Soc.*, 1936, 1034.

Lanthionine ($\beta\beta'$ -Diamino- $\beta\beta'$ -dicarboxydiethyl sulphide, sulphido- α -alanine)

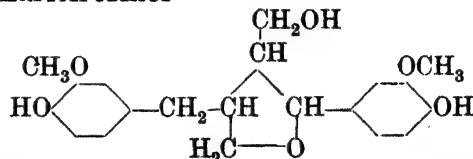
 $C_6H_{12}O_4N_2S$ MW, 208

Product of hydrolysis of wool. Softens at 270°. Decomp. at 304°.

Dibenzoyl: m.p. 205–6°.

Horn, Jones, Ringel, *J. Biol. Chem.*, 1941, 138, 141.

Vigneaud, Brown, *ibid.*, 151.

Lariciresinol $C_{20}H_{24}O_6$ MW, 360

Constituent of the wound resin of the European larch (*Larix decidua*). Needles from MeOH. M.p. 167–8°. Alc. $FeCl_3 \rightarrow$ green col. $H\cdot COOH$ or HCl -MeOH \rightarrow isolariciresinol, m.p. 112°.

Di-Me ether: prisms from Et₂O. M.p. 79–80°. $[\alpha]_D^{14} + 22^\circ$ in Me₂CO.

Di-Et ether: prisms from MeOH. M.p. 103–4°.

Haworth, Kelly, *J. Chem. Soc.*, 1937, 384, 1645.

Haworth, Woodcock, *J. Chem. Soc.*, 1939, 1054.

Lauryl-.

See Dodecyl-.

Lentine.

See Doryl.

Lepidic Acid.

See 4-Methylquinolinic Acid.

Lepidine-sulphonic Acid.

See 4-Methylquinoline-sulphonic Acid.

Leprotene $C_{40}H_{54}$

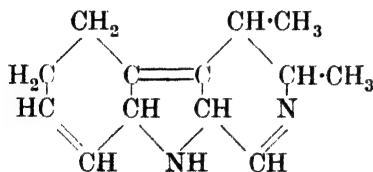
MW, 534

From acid fast lepra bacteria. Copper-red needles from C_6H_6 -MeOH. M.p. 198–200°. Contains 12 double bonds. Similar absorption maxima to β -carotene.

Grundmann, Takeda, *Naturwiss.*, 1937, 25, 27.

Takeda, Ohta, *Z. physiol. Chem.*, 1941, 267, 171; 1939, 258, 6.

Leptocladine (4 : 5-Dimethyl-4 : 5 : 6 : 7-tetrahydro-3-carboline)

 $C_{13}H_{19}N_2$

MW, 200

Alkaloid from *Arthrophytum leptocladum*, M. Pop. Rectangular plates. M.p. 109–10°. Sol. most org. solvents. Insol. H_2O . Gives red Ehrlich reaction.

B, HCl : needles. M.p. 234–5° decomp.

B_2, H_2PtCl_6 : orange cryst. M.p. 197–8° decomp.

N-Benzoyl: m.p. 132–3°.

Monopicrate: two forms. (a) Prepared in acid sols. m.p. 94–114°. (b) Prepared in EtOH, m.p. 176–7°.

Dipicrate: cryst. from Me_2CO . M.p. 181–2°.

Methiodide: cryst. from MeOH. M.p. 227–8°.

Yurashhevskii, *J. Gen. Chem. U.S.S.R.*, 1939, 9, 545; 1941, 11, 157.

Leucodrin $C_{15}H_{16}O_8$

MW, 324

Occurs in *Leucodendron concinnum*, *L. adscendens*, and *L. Stokoei*. Prisms from H_2O . M.p. 212–212.5°. $[\alpha]_D^{25}$ –19.2° in 40% EtOH.Aq.

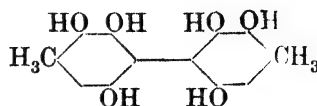
Tetra-acetyl: prisms from AcOH. M.p. 191–2°.

Mono-Me ether: $C_{16}H_{18}O_8$. MW, 338. Cryst. + H_2O . M.p. anhyd. 174–5°. $[\alpha]_D^{25}$ –19.9° in 40% EtOH.Aq. Monoacetyl: needles from AcOH.Aq. M.p. 102–3°.

Tetra-Me ether: $C_{16}H_{24}O_8$. MW, 380. Prisms from EtOH. M.p. 123–4°.

Rapson, *J. Chem. Soc.*, 1938, 282; 1939, 1085; 1940, 1271.

Leucophenicin (2 : 3 : 6 : 2' : 3' : 6'-Hexahydroxy-4 : 4'-ditolyl)

 $C_{14}H_{14}O_6$

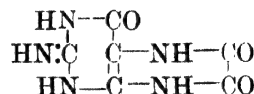
MW, 278

Produced by *Penicillium rubrum* grown on beer wort. Needles from H_2O . M.p. 247° decomp.

Hexa-acetyl: prisms from AcOH. M.p. 202–3°.

Tetrabenzoyl: needles from AcOEt. M.p. 212–14°. Alc. $FeCl_3$ → reddish brown col.

Posternak, *Helv. Chim. Acta*, 1938, 21, 1332.

Leucopterin $C_6H_5O_2N_5$

MW, 195

Wing pigment of many butterflies, e.g. *Pieris brassicae*, *Euchloe cardamines*, *Gonopteryx rhamni*, etc. Forms yellow Na and Ag salts and spar. sol. NH_4 salt. Dil. alk. sols. show blue fluor. HCl at 160–70° → $NH_2 \cdot CH_2 \cdot COOH + NH_3 + CO_2 + CO$. Gives murexide test but colour is different from that given by uric acid.

Purmann, *Ann.*, 1941, 548, 284.

Schöpf, *Naturwiss.*, 1940, 28, 478.

Wieland, Purmann, *Ann.*, 1940, 544, 163, 182.

Fromherz, Kotschmar, *Ann.*, 1938, 534, 283.

Wieland, Kotschmar, *Ann.*, 1937, 530, 152.

Schöpf, Becker, *Ann.*, 1936, 524, 55, 124; 1933, 507, 266.

Wieland, Metzger, Schöpf, Bülow, *Ann.*, 1933, 507, 226.

Leucotylin $C_{30}H_{52}O_3$

MW, 460

Isolated from *Parmelia leucotylica*, NyL. Prisms from MeOH. M.p. 333°. Sol. Py. Mod. sol. EtOH, $CHCl_3$, C_6H_6 . Spar. sol. Et_2O . $[\alpha]_D^{24}$ +49.43° in Py. Liebermann reaction → orange red → olive green col.

Diacyl: cryst. powder from AcOH.Aq. M.p. 240°.

Asahina, Akagi, *Ber.*, 1938, 71, 982.

Licanic Acid.

See Couepic Acid.

Limonin (*Evodin*, *obaculactone*, *dictamnolactone*, *citrolimonin*)

$C_{26}H_{30}O_8$

MW, 470

Dilactone isolated from bark of *Phellodendron amurense*, Rupr., from fruit of species of *Evodia*, from *Dictamnus albus*, Linn., from pulp and seeds of Valencia orange, and from seeds of several varieties of citrus. Colourless plates from EtOH. M.p. 297–8° decomp. Sol. Me_2CO , $CHCl_3$, AcOH. Insol. H_2O , Et_2O , pet. ether. $[\alpha]_D^{20} - 129^\circ$ in Me_2CO , $[\alpha]_D^{20} + 32.6^\circ$ in alc. KOH (0.5N). Conc. $H_2SO_4 \rightarrow$ intense reddish brown sol.

Schechter, Haller, *J. Am. Chem. Soc.*, 1940, **62**, 1307.

β -Linalolene.

See 3 : 7-Dimethyl-1 : 6-octadiene.

Linderic Acid (4-Dodecenoic acid, 4-undecylene-1-carboxylic acid)

$CH_3 \cdot [CH_2]_5 \cdot CH : CH \cdot [CH_2]_3 \cdot COOH$

$C_{12}H_{22}O_2$

MW, 198

Constituent of oil of Tohaku nuts (*Lindera obtusiloba*). M.p. 1–1.3°. B.p. 170–2°/13 mm. D_4^{20} 0.9081. n_D^{20} 1.4529. 0.5% $KMnO_4 \rightarrow$ dihydroxylauric acid, m.p. 102°.

p-Bromophenacyl ester : m.p. 47.5°.

p-Phenylphenacyl ester : m.p. 42.5°.

S-Benzylthiuronium salt : m.p. 139°.

Komcri, Ueno, *Bull. Chem. Soc. Japan*, 1937, **12**, 433.

Linoleyl Alcohol (9 : 12-Octadecadienol-1)

$CH_3 \cdot [CH_2]_4 \cdot CH : CH \cdot CH_2 \cdot CH : CH \cdot [CH_2]_7 \cdot CH_2OH$

$C_{18}H_{34}O$

MW, 266

M.p. – 5 to – 2°. B.p. 148–50°/1 mm. D_4^{20} 0.8612. n_D^{20} 1.4782.

p-Nitrophenylurethane : cryst. from MeOH. M.p. 91–2°.

Tetrabromide : cryst. from hexane. M.p. 87.5–88°.

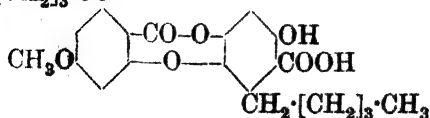
Kass, Miller, Burr, *J. Am. Chem. Soc.*, 1939, **61**, 482.

Kass, Burr, *J. Am. Chem. Soc.*, 1940, **62**, 1796.

Turpeinen, *J. Am. Chem. Soc.*, 1938, **60**, 56.

Lobaric Acid

$CH_3 \cdot [CH_2]_3 \cdot CO$



$C_{25}H_{28}O_8$

MW, 456

Occurs in several of the Lichen species. *Stereocaulon*. Needles from EtOH. M.p. 192°. Optically inactive. Hyd. \rightarrow acid, m.p. 183°.

Me ester : needles from MeOH. M.p. 122°.

Me ether : needles from MeOH. M.p. 102°.

Acetyl : needles from EtOH. M.p. 186°.

Oxime : needles from AcOH. M.p. 193°.

Asahina, Yasue, *Ber.*, 1936, **69**, 643.

Asahina, Nonomura, *Ber.*, 1935, **68**, 1698.

Lobinaline

$C_{28}H_{38}ON_2$

MW, 418

Alkaloid of *Lobelia cardinalis*, Linn. Cryst. from Et_2O . M.p. 94–5°. $[\alpha]_D^{24} + 22.3^\circ$ in $CHCl_3$. Depresses blood pressure.

B, HCl : cryst. + $5H_2O$. M.p. 220°.

Manske, *Can. J. Res.*, 1938, **16B**, 445.

Longilobine

$C_{18}H_{23}O_5N$

MW, 333

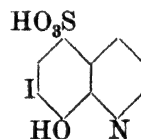
Alkaloid of *Senecio longilobus*. M.p. 217–18° decomp. $[\alpha]_D^{25} - 79.2^\circ$ in 95% EtOH. Hyd. \rightarrow retronecine + longinecic acid, $C_{10}H_{14}O_5$, m.p. 126–9°.

Methiodide : m.p. 249°.

Manske, *Can. J. Res.*, 1939, **17B**, 1.

Loretin

(7-Iodo-8-hydroxyquinoline-5-sulphonic acid)



$C_9H_6O_4NIS$

MW, 351

Yellow plates. Decomp. about 260°. Spar. sol. H_2O , EtOH. Prac. insol. Et_2O , $CHCl_3$, C_6H_6 . Disinfectant.

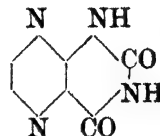
Claus, *Arch. Pharm.*, 1893, **231**, 706.

Cohn, *J. prakt. Chem.*, 1911, **83**, 503.

Loturine.

See Harman.

Lumazin



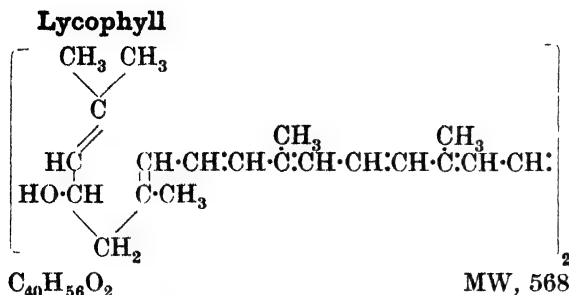
$C_6H_4O_2N_4$

MW, 164

Yellow needles from H_2O . M.p. above 350°. Bluish green fluor. in neutral aq. sol. Green fluor. in alk. sol. Blue fluor. in acid sol.

Kühling, *Ber.*, 1895, **28**, 1968.

Kuhn, Cook, *Ber.*, 1937, **70**, 761.

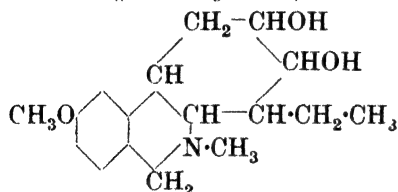


Accompanies lycopene in the fruits of various members of the *Solanaceae*, especially *S. dulcamara* (nightshade). Violet red needles or leaflets from C_6H_6 -MeOH or C_6H_6 -pet. ether. M.p. 179° corr. Absorption maxima at 5460, 5060 and 4720 Å. in CS_2 .

Dipalmitate: violet red micro-needles from C_6H_6 -MeOH. M.p. 76° corr.

Zechmeister, Cholnoky, *Ber.*, 1936, **69**, 422.

Lycoramine (*ψ*-Homolycorine)



Alkaloid from *Lycoris radiata*. M.p. $120-1^\circ$. Sol. H_2O , EtOH, Me_2CO , $CHCl_3$. Insol. pet. ether. $[\alpha]_D^{25} - 98.2^\circ$ in $CHCl_3$.

Perchlorate: prisms from H_2O . M.p. $138-9^\circ$.

Chloroplatinate: yellow plates + $1H_2O$ from H_2O . Decomp. at 245° .

Monoacetyl: m.p. 88° .

Diacetyl: needles from EtOH. M.p. 95° .

Picrate: m.p. $108-9^\circ$.

Methosulphate: m.p. $165-7^\circ$.

Methiodide: prisms from H_2O . Decomp. at 308° .

Kondo, Ishiwata, *Ber.*, 1937, **70**, 2427; *J. Pharm. Soc. Japan*, 1938, **58**, 1, 13.

Kondo, Tomisuura, Ishiwata, *J. Pharm. Soc. Japan*, 1932, **52**, 433.

Lycorenine

$C_{18}H_{21(23)}O_4N$ MW, 315 (317)
Alkaloid of *Lycoris radiata* Herb. Prisms from Me_2CO . M.p. 202° . $[\alpha]_D^{25} + 179.56^\circ$ in EtOH ($[\alpha]_D^{25} + 125.14^\circ$ in EtOH). Sol. most org. solvents except pet. ether.

B, HCl : decomp. at $146-7^\circ$.

B, H_2PtCl_6 : decomp. at 210° .

$B, H, AuCl_4$: decomp. at 116° .

Diacetyl: m.p. $183-4^\circ$.

Picrate: decomp. at 162° .

Kondo, Tomimura, Ishiwatari, *J. Pharm. Soc. Japan*, 1932, **52**, 51.

Kondo, Mitsuhashi, *J. Pharm. Soc. Japan*, 1934, **54**, 196.

Lycoxanthin

Formula as for lycophyll with $>CH_2$ in place of one $>CHOH$.

$C_{40}H_{56}O$ MW, 552

Accompanies lycopene in the fruits of various members of the *Solanaceae*, especially *S. dulcamara* (nightshade). Reddish brown plates from C_6H_6 -MeOH. M.p. 168° corr. Absorption maxima at 5470, 5070, 4730 Å. in CS_2 .

Acetyl: violet red needles from C_6H_6 -MeOH. M.p. 137° corr.

Zechmeister, Cholnoky, *Ber.*, 1936, **69**, 422.

M

M & B 693.

See Sulphapyridine.

Magnolamine

$C_{20}H_{23}O_4N$ MW, 341

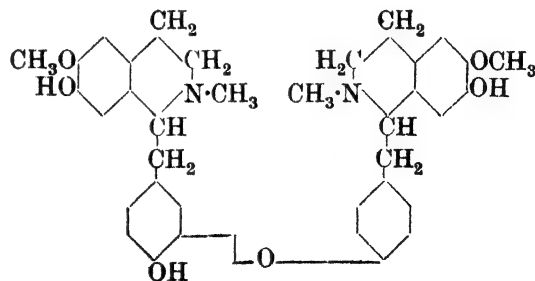
Phenolic alkaloid from *Magnolia fuscata*. Needles from C_6H_6 . M.p. $117-19^\circ$. Sol. EtOH, $CHCl_3$, alkalis. $[\alpha]_D + 111.6^\circ$ in EtOH.

Picrate: yellow micro-cryst. from EtOH. M.p. $142-5^\circ$ decomp.

Picrolonate: yellow powder from EtOH. M.p. $163-4^\circ$.

Proskournina, Orechhoff, *Bull. soc. chim.*, 1938, **5**, 1357.

Magnoline



Alkaloid from *Magnolia fuscata*. Micro-cryst. from C_6H_6 or EtOH. M.p. $178-9^\circ$. Spar. sol.

most org. solvents. Sol. alkalis. $[\alpha]_D - 9.6^\circ$ in Py.

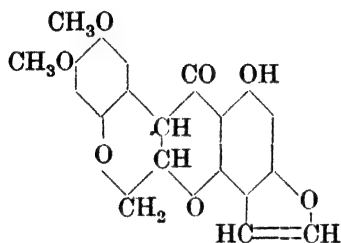
Tri-Me ether: m.p. 109–10°.

Picrate: yellow micro-cryst. powder from EtOH. M.p. 160–2° decomp.

Picrolonate: yellow micro-cryst. powder from EtOH. M.p. 190° decomp.

Proskournina, Orechhoff, *Bull. soc. chim.*, 1938, 5, 1357; *J. Gen. Chem. U.S.S.R.*, 1940, 10, 707.

Malaccol



$C_{20}H_{16}O_7$

MW, 368

l.

Occurs in *Derris malaccensis* (Kinta type). Yellow prisms or needles from $CHCl_3$ -EtOH. M.p. 225°, solidifying and remelting at 244°. Spar. sol. EtOH, Me_2CO , C_6H_6 . $[\alpha]_D^{18} + 190^\circ$ in $CHCl_3$.

Oxime: needles from MeOH. Decomp. at 240°.

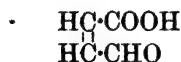
dl.

Pale yellow needles from $CHCl_3$ -EtOH. M.p. 249°.

Oxime: plates from isobutyl alcohol. Decomp. at 270°.

Harper, *J. Chem. Soc.*, 1941, 878; 1940, 309.

Maleic Semi-aldehyde (*Formylacrylic acid*)



$C_4H_4O_3$

MW, 100

Needles from Et_2O - C_6H_6 . M.p. 55°. B.p. 145°/10 mm. slight decomp. Very sol. H_2O , EtOH, Et_2O . Spar. sol. $CHCl_3$, C_6H_6 . Insol. ligroin.

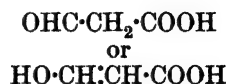
Et ester: 2:4-dinitrophenylhydrazones, m.p. 290–2°.

Oxime: cryst. from Et_2O . M.p. 130–40° decomp.

Phenylhydrazone: citron yellow needles. M.p. 158–9°.

Fecht, *Ber.*, 1905, 38, 1272.

Malonaldehydic Acid (*Formylacetic acid, aldehydoacetic acid, 2-hydroxyacrylic acid, malonic semi-aldehyde*)



$C_3H_4O_3$

MW, 88

Neither the free acid nor its methyl or ethyl esters have been isolated.

Nitrile: see Cyanoacetaldehyde.

Oxime: see Isonitrosopropionic Acid.

Semicarbazone: m.p. 116° decomp.

Me ester diethyl acetal: methyl 2:2-diethoxypropionate. $C_8H_{16}O_4$. MW, 176. B.p. 193°.

Et ester: *oxime*, m.p. 57–9°. *Semicarbazone*: m.p. 147–8°.

Et ester diethyl acetal: ethyl 2:2-diethoxypropionate. $C_9H_{18}O_4$. MW, 190. B.p. 93°/22 mm.

Rinkes, *Rec. trav. chim.*, 1927, 46, 273.

Straus, Voss, *Ber.*, 1926, 59, 1681.

Claisen, *Ber.*, 1903, 36, 3666.

Wohl, Emmerich, *Ber.*, 1900, 33, 2763.

Malonic Semi-aldehyde.

See Malonaldehydic Acid.

Malvidin chloride.

3- β -Glucoside: see Oenin chloride.

Maniladiol

$C_{30}H_{50}O_2$

MW, 442

Mono-unsaturated triterpene di-secondary glycol occurring in *Manila elemi* resin. Needles from MeOH.Aq. M.p. 220–1°. $[\alpha]_D^{19} + 68^\circ$ in $CHCl_3$.

Diformyl: needles from EtOH. M.p. 191–2°. $[\alpha]_D^{19} + 84^\circ$ in $CHCl_3$.

Diacetyl: needles from MeOH. M.p. 193–4°. $[\alpha]_D^{20} + 80^\circ$ in $CHCl_3$.

Dibenzoyl: needles from EtOH. M.p. 233–4°. $[\alpha]_D^{17} + 63.5^\circ$ in $CHCl_3$.

Morice, Simpson, *J. Chem. Soc.*, 1940, 795; 1942, 198.

Marrubiin

$C_{20}H_{28}O_4$

MW, 332

Diterpene lactone from *Marrubium vulgare*. Cryst. from EtOH. M.p. 160°. B.p. 200°/15 mm. Heat with Se \rightarrow 1:2:5-trimethylnaphthalene. Hyd. with alc. NaOH \rightarrow marrubic acid, m.p. 205° decomp.

Mercier, Mercier, *Compt. rend.*, 1932, 195, 1102.

Hollis, Richards, Robertson, *Nature*, 1939, 143, 604.

Lawson, Eustice, *J. Chem. Soc.*, 1939, 587.

Meletin.

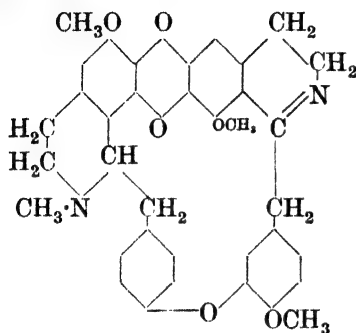
See Quercetin.

Menaphthyl Alcohol.

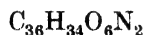
See Naphthylcarbinol.

Menaphthyl bromide.

See 1-Bromomethyl-naphthalene.

Menisarine

Probable constitution



MW, 590

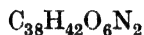
Alkaloid isolated from *Cocculus sarmentosus*, Diels. M.p. 208° (164°). Sol. most org. solvents except pet. ether.

B, HCl: decomp. at 279°.

B, 2HBr: decomp. at 285°.

Dimethiodide: decomp. at 269–70°.

Kondo, Tomita, *J. Pharm. Soc. Japan*, 1930, 50, 633; 1935, 55, 637, 911.

Menisine

MW, 622

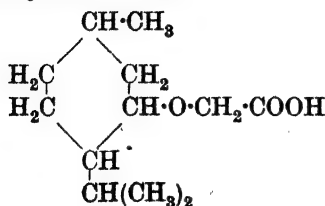
Alkaloid from the Chinese drug, mu-fang-chi. Isomeric with tetrandrine. Needles + 1H₂O. M.p. 127°, anhyd. 152°. [α]_D²⁰ + 290° in CHCl₃. Heat at 150° → tetrandrine.

B, HCl: amorphous powder. M.p. about 260°.

Hydrogen phosphate: prisms. M.p. 280°.

Methiodide: prisms. M.p. 263° decomp.

Chon, *Chinese Journal of Physiology*, 1935, 9, 267, (*Chem. Abstracts*, 1936, 30, 471).

Menthoxycetic Acid

MW, 214

l.

Cryst. from Et₂O. M.p. 35° (53–4°). B.p. 171°/11 mm. [α]_D²⁰ – 92.9° in MeOH. Chloride

is extensively used for the resolution of organic bases.

Me ester: C₁₃H₂₄O₃. MW, 228. B.p. 131°/8 mm.

Propyl ester: C₁₅H₂₈O₃. MW, 256. B.p. 172°/26 mm. [α]_D²⁰ – 91.5°.

Allyl ester: b.p. 182°/40 mm. [α]_D¹⁵ – 93.0°.

β-Naphthyl ester: cryst. from EtOH. M.p. 108–109.5°. [α]_D²⁵ – 84.4° in Me₂CO.

Chloride: C₁₂H₂₁O₂Cl. MW, 232.5. B.p. 124–30°/8.5 mm. [α]_D¹⁵ – 84.8° in CHCl₃.

Amide: C₁₂H₂₃O₂N. MW, 213. Needles from petrol. M.p. 94–5°.

Propylamide: b.p. 188–9°/16 mm. [α]_D²⁰ – 75.96°.

p-Nitroanilide: cryst. from EtOH. M.p. 106°. [α]_D²⁵ – 69.0° in Me₂CO.

d.

Cryst. M.p. 35°. B.p. 168–71°/8 mm. [α]_D²⁰ + 94.1° in EtOH.

dl.

B.p. 168°/9.5 mm.

Read, Grubb, *J. Soc. Chem. Ind.*, 1932, 51, 329.

Holmes, Adams, *J. Am. Chem. Soc.*, 1934, 56, 2093.

Frankland, O'Sullivan, *J. Chem. Soc.*, 1911, 99, 2329.

Mepacrine.

See Atebrin.

Mercaptoaminopropionic Acid.

See Cysteine.

Mercaptoaminobutyric Acid.

See Homocysteine.

Mercaptododecane.

See Dodecyl Mercaptan.

Mercaptoethyl Alcohol.

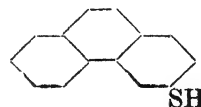
See Ethylene Thioglycol.

Mercaptoisopentane.

See active-Amyl Mercaptan, *tert.*-Amyl Mercaptan, and Isoamyl Mercaptan.

Mercaptonaphthylamine.

See Aminoethionaphthol.

3-Mercaptophenanthrene (3-Thiolphenanthrene)

MW, 210

Plates from EtOH. M.p. 112–13°. B.p. 205–10°/2 mm. Oxidised in alk. sol. by air or I → diphenanthryl-3-disulphide, m.p. 165°.

Me ether: C₁₅H₁₂S. MW, 224. Needles. M.p. 100°. B.p. 240°/12 mm.

Acetyl: needles from pet. ether. M.p. 93°.

Benzoyl: needles from pet. ether. M.p. 115°.

Field, *J. Chem. Soc.*, 1915, 107, 1215.

Mercaptotoluidine.

See Aminoethiocol.

Mesityl Alcohol.

See 3:5-Dimethylbenzyl Alcohol.

Mesityl chloride.

See Chloromesitylene.

Mesoapocamphoric Acid.

See under Apocamphoric Acid.

Mesobenzanthrone.

See Benzanthrone.

Mesylethylamine.

See Methylsulphonylethylamine.

Mesylmethylethylamine.

See Methylsulphonylmethylamine.

Methane-tricarboxylic Acid.

Di-Et ester-nitrile: see Diethyl cyanomalonate.

7-Methoxy-5-[γ-hydroxypropyl]-2-[3':4'-methylenedioxyphenyl]-coumarone.

See Egonol.

Methoxy-methylenedioxy-allylbenzene.

See Croweacin and Myristicin.

2-Methoxysafrol.

See Croweacin.

Methoxythioanisole.

See under Thiocatechol and Thiohydroquinone.

Methylallene.

See 1:2-Butadiene.

1-Methylallyl Alcohol.

See Methylvinylcarbinol.

2-Methylallyl Alcohol (Isopropenylcarbinol)



$\text{C}_4\text{H}_8\text{O}$

MW, 72

B.p. 114°. D_{20}^{20} 0.8524. n_D^{20} 1.4232. Forms azeotrope with water, b.p. 92°, containing 59.8% of the alcohol.

Formyl: b.p. 103°. n_D^{20} 1.4135.

Acetyl: b.p. 124° (120–3°). D_{20}^{20} 0.9239. n_D^{20} 1.4129.

Propionyl: b.p. 142°. D_{20}^{20} 0.9143. n_D^{20} 1.4170.

Butyryl: b.p. 161°. D_{20}^{20} 0.895. n_D^{20} 1.4230.

Isobutyryl: b.p. 152.5°.

Benzoyl: b.p. 120°/50 mm.

Cinnamoyl: b.p. 145–53°/8 mm.

Schales, *Ber.*, 1937, 70, 119.

Ryan, Shaw, *J. Am. Chem. Soc.*, 1940, 62, 3469.

3-Methylallyl Alcohol.

See Crotyl alcohol.

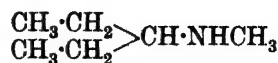
4-[β-Methylaminoethyl]-catechol.

See Epinine.

3-[ω-Methylaminoethyl]-indole.

See *N*-Methyltryptamine.

3-Methylaminopentane (N-Methyl-sec.-n-amine)



$\text{C}_6\text{H}_{15}\text{N}$

MW, 101

B.p. 106–7°.

Hydrogen oxalate: m.p. 142–3°.

Skita, Keil, Havemann, *Ber.*, 1933, 66, 1410.

Methyl-aminophenyl-benzthiazole.

See Dehydrothiotoluidine.

2-Methylamino-1-phenylpropane.

See Pervitin.

Methyl aminotolyl sulphide.

See under Aminoethiocol.

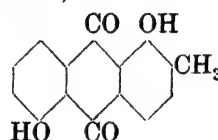
N-Methyl-sec.-n-amine.

See 3-Methylaminopentane.

N-Methylanthalamine.

See Anhalidine.

2-Methylanthrarufin (1:5-Dihydroxy-2-methylanthraquinone)



$\text{C}_{15}\text{H}_{10}\text{O}_4$

MW, 254

Orange brown needles from AcOH. M.p. 190° (187°).

Di-Me ether: $\text{C}_{17}\text{H}_{14}\text{O}_4$. MW, 282. Cryst. from AcOH. M.p. 176–7°.

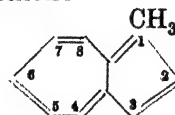
Diacetyl: yellow needles from Ac_2O . M.p. 230° (220°).

Mitter, Biswas, *J. Indian Chem. Soc.*, 1928, 5, 769.

Marriott, Robinson, *J. Chem. Soc.*, 1934, 1634.

Sibata, *J. Pharm. Soc. Japan*, 1940, 60, 510.

1-Methylazulene



$\text{C}_{11}\text{H}_{10}$

MW, 142

Dark blue liq.

Picrate: cryst. from EtOH. M.p. 134–5°.

sym.-*Trinitrobenzene add. comp.*: black needles from EtOH. M.p. 160–61°.

Plattner, Wyss, *Helv. Chim. Acta*, 1941, 24, 483.

2-Methylazulene.

M.p. 47-8°.

Picrate: black needles from EtOH. M.p. 130-1°.sym.-*Trinitrobenzene add. comp.*: dark brown needles from EtOH. M.p. 140-1°.Plattner, Wyss, *Helv. Chim. Acta*, 1941, 24, 483.**4-Methylazulene.**

Blue oil.

Picrate: black needles from EtOH. M.p. 144°.sym.-*Trinitrobenzene add. comp.*: black needles from EtOH. M.p. 177-8°.Pfau, Plattner, *Helv. Chim. Acta*, 1936, 19, 876.**5-Methylazulene.**

Blue oil.

Picrate: black needles from EtOH. M.p. 110-5°.sym.-*Trinitrobenzene add. comp.*: brownish black needles from EtOH. M.p. 151-5°.Plattner, Roniger, *Helv. Chim. Acta*, 1942, 25, 594. **α -Methylbenzhydrol.**

See 1 : 1-Diphenylethyl Alcohol.

Methylbenzoylacetic Acid.

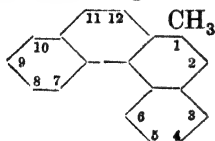
See 1-Benzoylpropionic Acid.

1-Methyl-2-benzoylpropionic Acid.

See 2-Benzoylisobutyric Acid.

Methyl-1' : 2'-benzphenanthrene.

See Methylchrysene.

1-Methyl-3' : 4'-benzphenanthrene $C_{19}H_{14}$

MW, 242

Cubes from EtOH. M.p. 77-8°. B.p. 210°/0.4 mm.

Picrate: red needles from EtOH. M.p. 112-13°.Hewett, *J. Chem. Soc.*, 1940, 297.**2-Methyl-3' : 4'-benzphenanthrene.**

Leaflets from EtOH. M.p. 70-4-71°.

Picrate: vermilion needles from C_6H_6 -EtOH. M.p. 141-8-143-2°.Newman, Joshel, *J. Am. Chem. Soc.*, 1940, 62, 973.Hewett, *J. Chem. Soc.*, 1936, 599.**6-Methyl-3' : 4'-benzphenanthrene.**

Plates from EtOH. M.p. 80-1°.

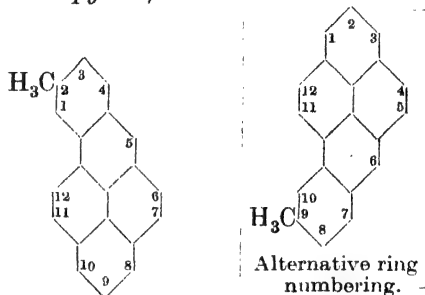
Dict. of Org. Comp.—II.

Picrate: vermilion needles from MeOH. M.p. 118-118-5°.Hewett, *J. Chem. Soc.*, 1938, 1289.**7-Methyl-3' : 4'-benzphenanthrene.**

Needles from EtOH. M.p. 54-54-5°.

Picrate: vermilion needles from EtOH. M.p. 134-134-5°.Hewett, *J. Chem. Soc.*, 1938, 1289.**8-Methyl-3' : 4'-benzphenanthrene.**

Plates from EtOH. M.p. 65-6°.

Picrate: red needles from EtOH. M.p. 107-8°.Hewett, *J. Chem. Soc.*, 1938, 1289.**2-Methyl-1' : 2'-benzpyrene (9-Methyl-7' : 8'-benzpyrene)** $C_{21}H_{14}$

MW, 266

Pale yellow needles from MeOH. M.p. 138-9°. Remelts at 140-140-2°.

Picrate: brown needles from C_6H_6 -ligroin. M.p. 184-5°.sym.-*Trinitrobenzene add. comp.*: red plates from C_6H_6 -ligroin. M.p. 211-5-212°.Fieser, Hershberg, *J. Am. Chem. Soc.*, 1938, 60, 1664.**3-Methyl-1' : 2'-benzpyrene (8-Methyl-7' : 8'-benzpyrene).**Greenish yellow needles from EtOH-Et₂O. M.p. 147-6-148-1°.*Picrate*: brownish red needles from C_6H_6 ligroin. M.p. 179-5-180°.sym.-*Trinitrobenzene add. comp.*: red needles from C_6H_6 -ligroin. M.p. 210-5-211°.Fieser, Hershberg, *J. Am. Chem. Soc.*, 1938, 60, 1665.**4-Methyl-1' : 2'-benzpyrene (7-Methyl-7' : 8'-benzpyrene).**

Yellow plates. M.p. 217-5-218°.

Picrate: purple brown needles from C_6H_6 . M.p. 203-4°.Fieser, Fieser, *J. Am. Chem. Soc.*, 1935, 57, 783.

5-Methyl-1' : 2'-benzpyrene (6-Methyl-7' : 8'-benzpyrene).

Yellow plates from Et₂O-EtOH. M.p. 215-7-216-2°.

Picrate : purple black needles from benzene-ligroin. M.p. 207-8°.

sym.-*Trinitrobenzene add. comp.* : red needles from C₆H₆-ligroin. M.p. 230-1°.

Fieser, Hershberg, *J. Am. Chem. Soc.*, 1938, **60**, 2547.

6-Methyl-1' : 2'-benzpyrene (5-Methyl-7' : 8'-benzpyrene).

Yellow needles from C₆H₆-ligroin. M.p. 171-171-5°.

Picrate : bronze coloured needles from C₆H₆-ligroin. M.p. 181-5-182-5°.

sym.-*Trinitrobenzene add. comp.* : red needles from C₆H₆-ligroin. M.p. 209-10°.

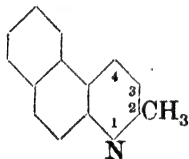
Fieser, Hershberg, *J. Am. Chem. Soc.*, 1938, **60**, 2547.

9-Methyl-1' : 2'-benzpyrene (2-Methyl-7' : 8'-benzpyrene).

Yellow needles from hexane. M.p. 146-8-148°.

sym.-*Trinitrobenzene add. comp.* : red needles from C₆H₆-ligroin. M.p. 218-5-219-5°.

Fieser, Novello, *J. Am. Chem. Soc.*, 1940, **62**, 1857.

2-Methyl-5' : 6'-benzquinoline (2-Methyl-β-naphthaquinoline, β-naphthaquinaldine)C₁₄H₁₁N

MW, 193

Needles from EtOH, plates from Et₂O. M.p. 82-3°. B.p. 214-15°/21 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O. Spar. volatile in steam.

Picrate : needles from AcOH.Aq. M.p. 224° decomp. Spar. sol. boiling H₂O.

Methiodide : yellow needles from H₂O. M.p. 241-7° decomp. Spar. sol. H₂O, boiling EtOH.

Kozlov, *J. Gen. Chem. U.S.S.R.*, 1938, **8**, 419.

Doebner, Felber, *Ber.*, 1894, **27**, 2021.

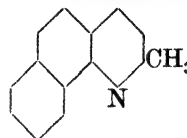
I.G., F.P. 739,880 (*Chem. Abstracts*, 1933, **27**, 2164).

4-Methyl-5' : 6'-benzquinoline (4-Methyl-β-naphthaquinoline, β-naphthalapidine).

Cryst. M.p. 91-2°. Conc. acid sol. → green fluor. → blue on dilution.

Picrate : cryst. from EtOH. M.p. 230-1°.

Knorr, *Ber.*, 1884, **17**, 544.

2-Methyl-7' : 8'-benzquinoline (2-Methyl-α-naphthaquinoline, α-naphthaquinaldine)C₁₄H₁₁N

MW, 193

B.p. 324-6°. D₄²⁰ 1.1464. n_D²⁰ 1.6738.

Picrate : m.p. 226° decomp. (186-7° decomp.).

Doebner, Miller, *Ber.*, 1884, **17**, 1711.

Kozlov, *J. Gen. Chem. U.S.S.R.*, 1938, **8**, 419.

Methylbutanol.

See active-Amyl Alcohol and tert.-Amyl Alcohol.

Methylbutylacetylene.

See 2-Heptene.

Methylbutylisobutylcarbinol.

See 2 : 4-Dimethyloctanol-4.

Methyl tert.-butyl sulphide.

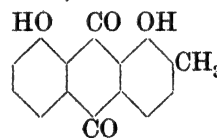
See under tert.-Butyl Mercaptan.

2-Methyl-3-carboline.

See Harman.

Methyl-β-chloroethylaniline.

See under N-β-Chloroethylaniline.

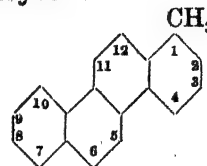
2-Methylchrysazin (1 : 8-Dihydroxy-2-methylanthraquinone)C₁₅H₁₀O₃

MW, 254

M.p. 175°.

Diacetyl : m.p. 205°.

Sibata, *J. Pharm. Soc. Japan*, 1940, **60**, 510.

1-MethylchryseneC₁₉H₁₄

MW, 242

Leaflets from hexane, C₆H₆ or toluene. M.p. 254-5° corr. in vac. (249-5-250°).

sym.-Trinitrobenzene add. comp.: yellow needles from C_6H_6 . M.p. 174–6°.

Bachmann, Struve, *J. Org. Chem.*, 1940, 5, 423.

Ruzicka, Markus, *Helv. Chim. Acta*, 1940, 23, 387.

2-Methylchrysene.

Leaflets from C_6H_6 -EtOH. M.p. 224.5–225.5°. Picrate: yellow needles from EtOH. M.p. 3–146°.

Bachmann, Struve, *J. Org. Chem.*, 1939, 4, 460.

3-Methylchrysene.

Leaflets from C_6H_6 -pet. ether. M.p. 170–170.5°.

Picrate: orange needles from EtOH. M.p. 164–164.5°.

Bachmann, Struve, *J. Org. Chem.*, 1940, 5, 427.

4-Methylchrysene.

Highly fluor. colourless plates from C_6H_6 -EtOH. M.p. 151–151.5° (149–149.5°).

Picrate: two forms. (a) Red needles from C_6H_6 -ligroin. M.p. 135–135.5°, remelting at 137.5–138°. (b) Orange needles from C_6H_6 -ligroin. M.p. 137.5–138°. Changes to red form on standing in contact with mother liquor.

Bachmann, Struve, *J. Org. Chem.*, 1939, 4, 461; 1940, 5, 428.

Fieser, Johnson, *J. Am. Chem. Soc.*, 1939, 61, 1654.

5-Methylchrysene.

Needles from C_6H_6 -EtOH. M.p. 117.2–117.8°. Brilliant bluish violet fluor. in UV. light.

Picrate: orange red needles from EtOH. M.p. 142.6–143°.

sym.-Trinitrobenzene add. comp.: orange needles from C_6H_6 -EtOH. M.p. 172.6–173.6°.

Fieser, Joshel, *J. Am. Chem. Soc.*, 1940, 62, 1214.

Newman, *J. Am. Chem. Soc.*, 1940, 62, 873.

6-Methylchrysene.

Fluor. needles from AcOEt-EtOH. M.p. 161–161.4° (159–159.8°).

Picrate: orange needles from C_6H_6 -EtOH. M.p. 170–170.6° (169.8–170.2°).

sym.-Trinitrobenzene add. comp.: yellow needles from C_6H_6 -EtOH. M.p. 189.8–190.6° (188.5–189.5°).

Fieser, Joshel, Seligman, *J. Am. Chem. Soc.*, 1939, 61, 2138.

Newman, *J. Am. Chem. Soc.*, 1938, 60, 2950.

2-Methylcrotonaldehyde.

See 2: 2-Dimethylacrolein.

Methyl cyclopentyl Ketone.

See Acetocyclopentane.

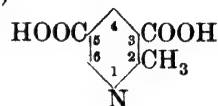
N-Methyl-2-[3:4-dihydroxyphenyl]-ethylamine.

See Epinine.

Methyl dihydroxytolyl Ketone.

See Dihydroxymethylacetophenone.

2-Methyldinicotinic Acid (α -Picoline- β : β' -dicarboxylic acid, 2-methylpyridine-3:5-dicarboxylic acid)



$C_8H_7O_4N$

MW, 181

Needles + $1H_2O$ from H_2O . M.p. anhyd. 245–50° decomp. $KMnO_4 \rightarrow$ pyridine-2:3:5-tricarboxylic acid.

Weber, *Ann.*, 1887, 241, 9.

4-Methyldinicotinic Acid.

Needles from H_2O . M.p. 282–4° decomp.; turns yellow at 250°. Mod. sol. EtOH. Spar. sol. Et_2O , $CHCl_3$.

Wolff, *Ann.*, 1902, 322, 377.

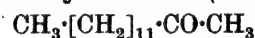
Methyldiphenylcarbinol.

See 1: 1-Diphenylethyl Alcohol.

Methyldiphenylitaconic Acid.

See 1: 1-Diphenyl-1-butylene-2:3-dicarboxylic Acid.

Methyl dodecyl Ketone (Tetradecanone-2)



$C_{14}H_{28}O$

MW, 212

Cryst. from EtOH.Aq. M.p. 33–4°. B.p. 205–6°/100 mm.

Majima, Nakamura, *Ber.*, 1915, 48, 1603.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, 44, 108T.

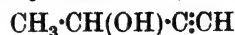
Methylenedi-2-naphthol.

See 2: 2'-Dihydroxy-1:1'-dinaphthylmethane.

6:7-Methylenedioxycoumarin.

See Ayapin.

Methylethinylcarbinol (1-Butinol-3)



C_4H_6O

MW, 70

B.p. 106.5–107.5°. D^{20}_D 0.8858. n^{20}_D 1.4265.

Kreimeier, U.S.P. 2,106,181, (*Chem. Abstracts*, 1938, 32, 2547).

McCallum, U.S.P. 2,125,384, (*Chem. Zentr.*, 1938, II, 3005).

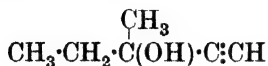
Lespieau, *Bull. soc. chim.*, 1926, 39, 991.

Methylethylacetophenone.See *sec.*-Butyl phenyl Ketone.**2-Methyl-3-ethylbutane.**

See 2 : 3-Dimethylpentane.

2-Methyl-3-ethyl-1-butylene.

See 2 : 3-Dimethyl-1-pentene.

Methylethylethynylcarbinol (3-Methyl-1-pentynol-3) $\text{C}_6\text{H}_{10}\text{O}$

MW, 98

B.p. 120–1°, 78°/150 mm. D_4^{20} 0.8688. n_D^{20} 1.4310.Campbell, Campbell, Eby, *J. Am. Chem. Soc.*, 1938, **60**, 2882.Thompson, Burr, Shaw, *J. Am. Chem. Soc.*, 1941, **63**, 186.Coffmann, *Organic Syntheses*, XX, 41.**Methylethylisohexylcarbinol.**

See 3 : 7-Dimethyloctanol-3.

Methylethylpyrrole.

N-Me : see Dimethylethylpyrrole.

Methylgentisic Acid.

See Dihydroxytoluic Acid.

2-Methylglucose methylglucoside.

See 1 : 2-Dimethylglucose.

1-Methylglyceric Acid.

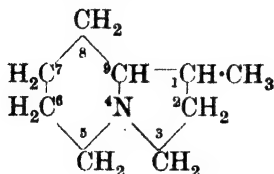
See 1 : 2-Dihydroxyisobutyric Acid.

3-Methylheptandione-2 : 6.

See 1 : 3-Diacetobutane.

Methyl-*p*-hydroxybenzoylcarbinol.See 4 : β -Dihydroxypropionophenone.**Methyl-hydroxymethylnaphthalene.**

See Methylnaphthylcarbinol.

1-Methylindolizidine (1-Methyloctahydro-pyrrocoline) $\text{C}_9\text{H}_{17}\text{N}$

MW, 139

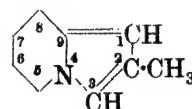
B.p. 62°/11 mm.

Picrate : lemon yellow prisms from EtOH. M.p. 191° decomp.*Picrotonate* : pale brown prisms. M.p. 198° decomp.Clemo, Metcalfe, *J. Chem. Soc.*, 1937, 1523.**2-Methylindolizidine.**B.p. 71–2°/26 mm. D_4^{20} 0.8837. n_D 1.4668.*B, HBr* : cryst. M.p. 164°.*B, H, AuCl₄* : prisms from EtOH. Aq. M.p. 106°.*Picrate* : m.p. 161–2°.*Methiodide* : m.p. 227°.Ochiai, Tsuda, *Ber.*, 1934, **67**, 1013.**3-Methylindolizidine.**

B.p. 168–9°, 81°/40 mm., 32–5°/1 mm.

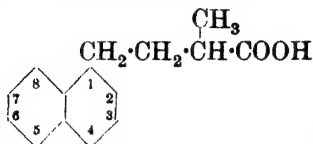
B, HBr : decomp. at 292°.*B, H, AuCl₄* : cryst. from EtOH–HCl. M.p. 145–6°.*B, HgCl₂* : m.p. 221°.*Picrate* : yellow clusters. M.p. 197°.*Picrotonate* : pale brown prisms. M.p. 208°.*Methiodide* : plates from AcOEt. M.p. 311–12°.Ochiai, Tsuda, *Ber.*, 1934, **67**, 1013.Clemo, Morgan, Raper, *J. Chem. Soc.*, 1935, 1743.Clemo, Metcalfe, Raper, *J. Chem. Soc.*, 1936, 1429.Clemo, Metcalfe, *J. Chem. Soc.*, 1937, 1518.Diels, Schrum, *Ann.*, 1937, **530**, 78.**5-Methylindolizidine.**

B.p. 79°/15 mm.

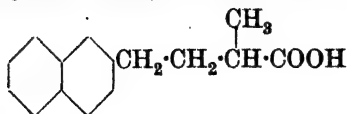
Chloroplatinate : orange. Softens at 170°. Decomp. at 220°.*Picrate* : two forms. Both in yellow needles from H_2O . M.p. 235° decomp. and 196° decomp.Lions, Willison, *J. Proc. Roy. Soc. N.S. Wales*, 1940, **73**, 240.**2-Methylindolizine** (2-Methylpyrrocoline, 2-methylpyrindole) $\text{C}_9\text{H}_9\text{N}$

MW, 131

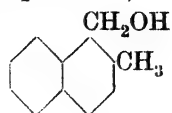
Cryst. M.p. 59–60°. B.p. 95°/9 mm. Sol. most org. solvents. Very volatile in steam and in air. Gives deep blue ppt. with I in conc. NaHCO_3 . Intense red pine splinter reaction. Fusion with oxalic acid \rightarrow green mass, sol. H_2O .Tschitschibabin, *Ber.*, 1927, **60**, 1615.Kondo, Osawa, *J. Pharm. Soc. Japan*, 1936, **56**, 73.**3-Methylindolizine.**B.p. 230°. Sol. most org. solvents. . Prac. insol. H_2O . Unstable in air. Gives intense red pine splinter reaction. Fusion with oxalic acid \rightarrow violet mass, sol. H_2O .Tschitschibabin, Stepanow, *Ber.*, 1930, **63**, 471.

Methylisopropenylbenzene.*See* Tolypropylene.**Methylisopropyl-*n*-amylcarbinol.***See* 2 : 3-Dimethyloctanol-3.**2-Methyl-5-isopropylanisic Acid.***See under p*-Thymotinic Acid.**Methylisopropylbutylcarbinol.***See* 2 : 3-Dimethylheptanol-3.**Methylisopropylcyclohexenone.***See* Carvenone and Menthone.**1-Methyl-4-isopropylcyclopentene.***See* Apofenchene.**6-Methylisovanillin.***See under* 4 : 5-Dihydroxy-*o*-toluic Aldehyde.**Methyl-lepidine.***See* Dimethylquinoline.**Methylnaphthaquinoline.***See* Methylbenzquinoline.**Methylnaphthohydroquinone.***See* Dihydroxy-methylnaphthalene.**1-Methyl-3- α -naphthylbutyric Acid** $\text{C}_{15}\text{H}_{16}\text{O}_2$

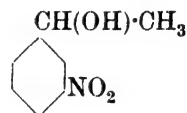
MW, 228

Prisms from pet. ether- Et_2O . M.p. 90° .Haworth, *J. Chem. Soc.*, 1932, 1132.**3-Methyl-3- α -naphthylbutyric Acid (3- α -Naphthylvaleric acid).**Plates from C_6H_6 -pet. ether. M.p. $78-80^\circ$.Bachmann, Edgerton, *J. Am. Chem. Soc.*, 1940, 62, 2221.**3-[5-Methyl- α -naphthyl]-butyric Acid.**Needles from MeOH. M.p. $128-9^\circ$.Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 458.**3-[6-Methyl- α -naphthyl]-butyric Acid.**Cryst. from Et_2O . M.p. $116-18^\circ$ corr.*Me ester* : b.p. $160^\circ/2$ mm.Orcutt, Bogert, *J. Am. Chem. Soc.*, 1941, 63, 130.**1-Methyl-3- β -naphthylbutyric Acid** $\text{C}_{15}\text{H}_{16}\text{O}_2$

MW, 228

Needles from pet. ether. M.p. $85-6^\circ$.Haworth, *J. Chem. Soc.*, 1932, 1132.**3-[6-Methyl- α -naphthyl]-butyric Acid.**Plates from MeOH. M.p. $111-12^\circ$.Haworth, Letsky, Mavin, *J. Chem. Soc.*, 1932, 1787.**2-Methyl-1-naphthylcarbinol (2-Methyl-1-hydroxymethylnaphthalene)** $\text{C}_{12}\text{H}_{12}\text{O}$

MW, 172

Cryst. from $\text{EtOH}-\text{C}_6\text{H}_6$. M.p. $136-7^\circ$.*Phenylurethane* : cryst. M.p. $127-8^\circ$.Ziegler, Tiemann, *Ber.*, 1922, 55, 3410.**4-Methyl-1-naphthylcarbinol (4-Methyl-1-hydroxymethylnaphthalene).**Needles from C_6H_6 . M.p. $74-5^\circ$. Sol. EtOH , Et_2O . Spar. sol. pet. ether.*Phenylurethane* : needles from C_6H_6 or EtOH.Aq. M.p. 103° .*See previous reference.***Methyl-*m*-nitrophenylcarbinol (1-*m*-Nitrophenylethyl alcohol, *m*-nitro- α -hydroxyethylbenzene)** $\text{C}_8\text{H}_9\text{O}_3\text{N}$

MW, 167

Cryst. from EtOH . M.p. $62-5^\circ$.Lund, *Ber.*, 1937, 70, 1524.**Methyl-*p*-nitrophenylcarbinol (1-*p*-Nitrophenylethyl alcohol, *p*-nitro- α -hydroxyethylbenzene).**B.p. $158^\circ/16$ mm.*Acetyl* : b.p. $161-3^\circ/16$ mm.*Phenylurethane* : m.p. $205-6^\circ$.v. Braun, Bartsch, *Ber.*, 1913, 46, 3053.**2-Methylnonanol-2.***See* Dimethylheptylcarbinol.**2-Methylnorharman.***See* Harman.**Methyloctahydropyrrocoline.***See* Methylindolizidine.**2-Methyloctanol-4.***See* Butylisobutylcarbinol.**1-Methylol-2-naphthol.***See* 1-Hydroxymethyl-2-naphthol.**3-Methylpentane-1 : 1-dicarboxylic Acid.***See active*-Amylmalonic Acid.**3-Methyl-1-pentine.***See sec.n*-Butylacetylene.

Methylpentinol

Methylpentinol.

See Methylenelethynylcarbinol and Isopropylethynylcarbinol.

2-Methyl-1-phenylbutanol-1.

See sec.-Butylphenylcarbinol.

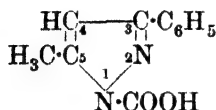
Methylphenylbutyric Acid.

See Dimethylhydrocinnamic Acid.

N-Methyl-1-phenylisopropylamine.

See Pervitin.

5-Methyl-3-phenylpyrazole-1-carboxylic Acid



$C_{11}H_{10}O_2N_2$ MW, 202

Me ester: $C_{12}H_{12}O_2N_2$. MW, 216. Prisms. M.p. 61.5–62°.

Et ester: $C_{13}H_{14}O_2N_2$. MW, 230. M.p. 73.5–74.5°. B.p. 193°/10 mm.

Chloride: $C_{11}H_9ON_2Cl$. MW, 220.5. Needles from pet. ether. M.p. 94°.

Amide: $C_{11}H_{11}ON_3$. MW, 201. Needles from H_2O . M.p. 157–8° (154–6°). Sol. EtOH, Et_2O , hot H_2O .

Auwers, Dietrich, *J. prakt. Chem.*, 1934, 139, 65.

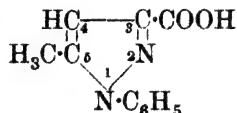
Auwers, Stuhlmann, *Ber.*, 1926, 59, 1051.

3-Methyl-5-phenylpyrazole-1-carboxylic Acid.

Et ester: needles from pet. ether. M.p. 65–6°.

Auwers, Dietrich, *J. prakt. Chem.*, 1934, 139, 65.

5-Methyl-1-phenylpyrazole-3-carboxylic Acid



$C_{11}H_{10}O_2N_2$ MW, 202

Prisms or needles from H_2O . M.p. hydrated 106°, anhyd. 136°. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Me ester: $C_{12}H_{12}O_2N_2$. MW, 216. Plates. M.p. 55–6°.

Chloride: $C_{11}H_9ON_2Cl$. MW, 220.5. Needles from ligroin. M.p. 85°. B.p. 187°/40 mm., 115–45°/15 mm. Sol. EtOH, $CHCl_3$, C_6H_6 . Spar. sol. Et_2O , pet. ether.

Amide: $C_{11}H_{11}ON_3$. MW, 201. Cryst. from EtOH. M.p. 146°. Very sol. H_2O .

Anilide: $C_{17}H_{15}ON_3$. MW, 277. Needles from EtOH. M.p. 138°.

Rojahn, Seitz, *Ann.*, 1924, 437, 300.

Claisen, Roosen, *Ann.*, 1894, 278, 278.

886 3-Methyl-5-phenylpyrazole-4-carboxylic Acid

1-Methyl-4-phenylpyrazole-3-carboxylic Acid.

Leaflets from EtOH. M.p. 132°.

Me ester: cryst. from C_6H_6 . M.p. 122–3°.

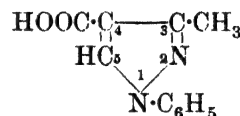
Auwers, Ungenach, *Ber.*, 1933, 66, 1692.

1-Methyl-5-phenylpyrazole-3-carboxylic Acid.

Cryst. + H_2O from H_2O . M.p. 84–6°, anhyd. 143–4°. Sol. EtOH, Et_2O , hot H_2O . Spar. sol. C_6H_6 .

Auwers, Mausolf, *Ber.*, 1927, 60, 1733.

3-Methyl-1-phenylpyrazole-4-carboxylic Acid



$C_{11}H_{10}O_2N_2$ MW, 202

Needles. M.p. 194–5° (192.5–193°). Insol. H_2O . At 230° → CO_2 and 3-methyl-1-phenylpyrazole.

Bülow, *Ber.*, 1900, 33, 3269.

Balbiano, *Gazz. chim. ital.*, 1898, 28, i, 387.

5-Methyl-1-phenylpyrazole-4-carboxylic Acid.

Leaflets and prisms from H_2O . M.p. 167–8°. Sol. EtOH, Et_2O . Very spar. sol. cold H_2O , ligroin. Rapid dist. → CO_2 + 5-methyl-1-phenylpyrazole.

Me ester: $C_{12}H_{12}O_2N_2$. MW, 216. Prisms from 80% MeOH. M.p. 71°.

Et ester: $C_{13}H_{14}O_2N_2$. MW, 230. Plates from ligroin. M.p. 55–6°.

Chloride: $C_{11}H_9ON_2Cl$. MW, 220.5. Needles from ligroin. M.p. 147°. B.p. 260–70°/25 mm.

Anhydride: $C_{22}H_{18}O_3N_4$. MW, 386. Cryst. from C_6H_6 . M.p. 156°.

Anilide: cryst. from EtOH– C_6H_6 . M.p. 182°.

p-Toluidide: needles from EtOH. M.p. 177°.

α-Naphthalide: needles from EtOH. M.p. 168°.

β-Naphthalide: needles from EtOH. M.p. 170°.

Rojahn, Fahr, *Ann.*, 1923, 434, 263.

Claisen, *Ann.*, 1897, 295, 313.

Dains, Brown, *J. Am. Chem. Soc.*, 1909, 31, 1156.

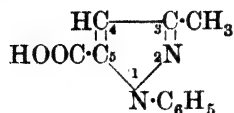
3-Methyl-5-phenylpyrazole-4-carboxylic Acid.

Needles from EtOH. M.p. 260–5°.

Sjollema, *Ann.*, 1894, 279, 251.

3-Methyl-1-phenylpyrazole-5-carboxylic Acid 887

3-Methyl-1-phenylpyrazole-5-carboxylic Acid



$C_{11}H_{10}O_2N_2$ MW, 202

Needles from H_2O . M.p. 189–90°.

Me ester: $C_{12}H_{12}O_2N_2$. MW, 216. Needles from MeOH.Aq. M.p. 65–6°.

Chloride: $C_{11}H_9ON_2Cl$. MW, 220.5. M.p. 39–41°. B.p. 160–4°/17 mm.

Amide: $C_{11}H_{11}O_2N_3$. MW, 201. Prisms from MeOH.Aq. M.p. 181°.

Claisen, Roosen, *Ann.*, 1894, **278**, 288.

Rojahn, Seitz, *Ann.*, 1924, **437**, 304.

1-Methyl-3-phenylpyrazole-5-carboxylic Acid.

Cryst. from 33% EtOH. M.p. 183–4°. Sol. EtOH, Et_2O . Spar. sol. C_6H_6 , hot H_2O .

Auwers, Ungemach, *Ber.*, 1933, **66**, 1693.

1-Methyl-4-phenylpyrazole-5-carboxylic Acid.

Cryst. from MeOH. M.p. 210–11° decomp. Sol. Me_2CO . Mod. sol. MeOH, EtOH. Spar. sol. H_2O , Et_2O , C_6H_6 . Difficult to esterify.

Me ester: cryst. from pet. ether. M.p. 69°.

Et ester: $C_{13}H_{14}O_2N_2$. MW, 230. Prisms from pet. ether. M.p. 52.5–53.5°.

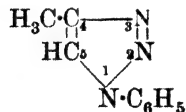
Auwers, Ungemach, *Ber.*, 1933, **66**, 1692.

4-Methyl-3(5)-phenylpyrazole-5(3)-carboxylic Acid.

Yellowish brown powder + $1H_2O$ from EtOH. M.p. anhyd. 234–6° decomp. Sol. EtOH, Me_2CO . Very spar. sol. H_2O .

Auwers, Cauer, *Ann.*, 1929, **470**, 301.

4-Methyl-1-phenyl-1:2:3-triazole



$C_9H_9N_3$ MW, 159

Leaflets from ligroin. M.p. 81°.

Bertho, *Ber.*, 1925, **58**, 862.

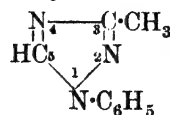
5-Methyl-1-phenyl-1:2:3-triazole.

Leaflets from pet. ether. M.p. 64°. Spar. sol. H_2O . Difficultly volatile in steam. Weak base.

Dimroth, *Ber.*, 1902, **35**, 1033.

2-Methyl-5-phenyl-1:3:4-triazole

3-Methyl-1-phenyl-1:2:4-triazole



$C_9H_9N_3$ MW, 159

Prisms from H_2O . M.p. 86.5–87°. B.p. 274°. Sol. H_2O , hot pet. ether. Difficultly volatile in steam.

Picrate: needles from EtOH. M.p. 171°.

Ethobromide: prisms from EtOH.Aq. M.p. 222–4°. Insol. Et_2O . Antipyretic.

Methiodide: plates. M.p. 185–6° part. decomp.

Ethiodide: prisms from H_2O or EtOH. M.p. 181–2°. Sol. H_2O , EtOH. Spar. sol. Et_2O . Antipyretic.

Bamberger, Frei, *Ber.*, 1902, **35**, 749.

Pellizzari, *Gazz. chim. ital.*, 1911, **41**, 33.

5-Methyl-1-phenyl-1:2:4-triazole.

B.p. 275°.

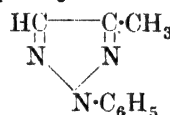
$B_2H_2PtCl_6 \cdot 2H_2O$: yellow plates. M.p. 129° (122–4° decomp.).

Picrate: prisms from EtOH. M.p. 146°.

Pellizzari, *Gazz. chim. ital.*, 1911, **41**, 34.

Bamberger, *Ber.*, 1911, **44**, 3564.

3-Methyl-1-phenyl-1:2:5-triazole

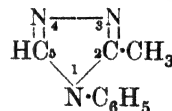


$C_9H_9N_3$ MW, 159

B.p. 242°, 149–50°/60 mm. D_4^{25} 1.1071.

Pechmann, *Ann.*, 1891, **262**, 279.

2-Methyl-1-phenyl-1:3:4-triazole



$C_9H_9N_3$ MW, 159

Plates + $1H_2O$. M.p. 68°, anhyd. 112°.

$B_2H_2PtCl_6$: plates. M.p. 206°.

Picrate: cryst. from EtOH. M.p. 134°.

Pellizzari, *Gazz. chim. ital.*, 1911, **41**, 41.

1-Methyl-2-phenyl-1:3:4-triazole.

Needles from Et_2O . M.p. 112–13°. Sol. EtOH, hot H_2O , hot Et_2O , dil. acids.

Young, Oates, *J. Chem. Soc.*, 1901, **79**, 668.

2-Methyl-5-phenyl-1:3:4-triazole.

Needles from C_6H_6 . M.p. 164.5°. Sol. dil. HCl.

Hydrochloride : m.p. 230°.

Picrate : m.p. 158°.

Heller et al., *J. prakt. Chem.*, 1929, **120**, 62.

Methylpropenylbenzene.

See Tolypropylene.

Methylpropylisoamylcarbinol.

See 4 : 7-Dimethyloctanol-4.

Methylpropylisobutylcarbinol.

See 2 : 4-Dimethylheptanol-4.

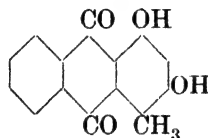
Methylprotocatechuic Acid.

See Dihydroxytoluic Acid.

Methylprotocatechuic Aldehyde.

See Dihydroxytoluic Aldehyde.

4-Methylpurpurioxanthin (1 : 3-Dihydroxy-4-methylanthraquinone, 4-methylxanthopurpurin)



$C_{15}H_{10}O_4$

MW, 254

Orange cryst. from C_6H_6 . M.p. 265–6° (251°).

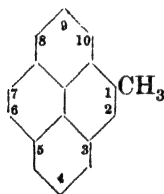
Di-Me ether : $C_{17}H_{14}O_4$. MW, 282. Yellow needles from $CHCl_3$. M.p. 162°.

Diacetyl : yellow needles from AcOH. M.p. 181–2° (176.5°).

Mitter, Sen, Paul, *Chem. Abstracts*, 1928, **22**, 2562.

Stouder, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2045.

1-Methylpyrene



$C_{17}H_{12}$

MW, 216

Leaflets from EtOH. M.p. 147.5–148.5°.

Picrate : red needles from EtOH. M.p. 226–7°.

Bachmann, Edgerton, *J. Am. Chem. Soc.*, 1940, **62**, 2973.

3-Methylpyrene.

Plates from EtOH. M.p. 71–2°. Conc. H_2SO_4 → yellow sol. with green fluor.; on warming → olive green sol. with violet fluor.

Picrate : brownish red needles from C_6H_6 . M.p. 211–12°.

Vollmann, Becker, Corell, Streeck, *Ann.*, 1937, **531**, 112.

4-Methylpyrene.

Flakes from EtOH. M.p. 143–143.5°. Conc. H_2SO_4 → orange sol. with green fluor.; on warming → yellow sol. with violet fluor.

Vollmann, Becker, Corell, Streeck, *Ann.*, 1937, **531**, 142.

Methylpyridine-dicarboxylic Acid.

See Methylcinchomeronic Acid, Uvitic Acid, Methylquinolinic Acid and Methylnicotinic Acid.

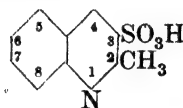
Methylpyrindole.

See Methylindolizine.

Methylpyrrocoline.

See Methylindolizine.

2-Methylquinoline-3-sulphonic Acid (Quinaldine-3-sulphonic acid)



$C_{10}H_9O_3NS$

MW, 223

Needles from H_2O . M.p. above 270°.

Chloride : pale yellow needles from petrol. M.p. 121°.

Besthorn, Geisselbrecht, *Ber.*, 1920, **53**, 1026.

2-Methylquinoline-4-sulphonic Acid (Quinaldine-4-sulphonic acid).

M.p. above 270°. Spar. sol. H_2O .

Besthorn, Geisselbrecht, *Ber.*, 1920, **53**, 1025.

2-Methylquinoline-5-sulphonic Acid (Quinaldine-5-sulphonic acid).

Cryst. from H_2O . KOH fusion → 5-hydroxyquinaldine. Heat Na salt + KCN → quinaldine + 5-cyanoquinaldine.

Doebner, Miller, *Ber.*, 1884, **17**, 1703.

Chem. Fabr. Schering, D.R.P. 29,819.

2-Methylquinoline-6-sulphonic Acid (Quinaldine-6-sulphonic acid).

Cryst. from H_2O . KOH fusion → 6-hydroxyquinaldine.

Doebner, Miller, *Ber.*, 1884, **17**, 1704.

2-Methylquinoline-8-sulphonic Acid (Quinaldine-8-sulphonic acid).

Prisms from H_2O . KOH fusion → 8-hydroxyquinaldine.

Doebner, Miller, *Ber.*, 1884, **17**, 1703.

4-Methylquinoline-2-sulphonic Acid
(*Lepidine-2-sulphonic acid*).

M.p. above 270°. Boiling $\text{H}_2\text{O} \rightarrow$ 2-hydroxylepidine.

Besthorn, Geisselbrecht, *Ber.*, 1920, 53, 1024.

4-Methylquinoline-6-sulphonic Acid
(*Lepidine-6-sulphonic acid*).

Needles + $1\text{H}_2\text{O}$ from H_2O . Mod. sol. EtOH. NaOH fusion \rightarrow 6-hydroxylepidine.

Busch, Koenigs, *Ber.*, 1890, 23, 2680.

6-Methylquinoline-5-sulphonic Acid.

KOH fusion \rightarrow 5-hydroxy-6-methylquinoline.

Noelting, Trautmann, *Ber.*, 1890, 23, 3658.

Claus, Kaufmann, *J. prakt. Chem.*, 1897, 55, 526.

6-Methylquinoline-7-sulphonic Acid.

Needles + $1\text{H}_2\text{O}$ from H_2O . KOH fusion \rightarrow 7-hydroxy-6-methylquinoline. $\text{CrO}_3 \rightarrow$ quinoline-6-carboxylic-7-sulphonic acid. Heat Na salt + KCN \rightarrow 7-cyano-6-methylquinoline.

Edinger, Bühler, *Ber.*, 1909, 42, 4315.

6-Methylquinoline-8-sulphonic Acid.

Plates from H_2O . NaOH fusion \rightarrow 8-hydroxy-6-methylquinoline. $\text{CrO}_3 \rightarrow$ quinoline-6-carboxylic-8-sulphonic acid.

Fischer, Willmack, *Ber.*, 1884, 17, 441.

8-Methylquinoline-5-sulphonic Acid.

Needles from H_2O . NaOH fusion \rightarrow 5-hydroxy-8-methylquinoline. $\text{CrO}_3 \rightarrow$ quinoline-8-carboxylic-5-sulphonic acid.

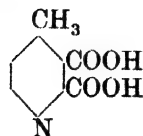
Herzfeld, *Ber.*, 1884, 17, 904, 1550.

8-Methylquinoline-6-sulphonic Acid.

Prisms from H_2O . $\text{CrO}_3 \rightarrow$ quinoline-8-carboxylic-6-sulphonic acid.

Herzfeld, *Ber.*, 1884, 17, 903.

4-Methylquinolinic Acid (γ -Picoline-2 : 3-dicarboxylic acid, *lepidic acid*, 4-methylpyridine-2 : 3-dicarboxylic acid)



$\text{C}_8\text{H}_7\text{O}_4\text{N}$

MW, 181

Prisms or plates from H_2O . M.p. 186° decomp. Sol. 118 parts H_2O at 10°. Very spar. sol. EtOH, Et_2O , C_6H_6 . Aq. sol. + $\text{FeSO}_4 \rightarrow$ yellow col. Heat at 160–170° or with AcOH

\rightarrow 4-methylpyridine-3-carboxylic acid. Alk. $\text{KMnO}_4 \rightarrow$ pyridine-2 : 3 : 4-tricarboxylic acid.

Besthorn, Byvanek, *Ber.*, 1898, 31, 801.

Hoogewerff, van Dorp, *Ber.*, 1881, 14, 645.

Methylresacetophenone.

See Dihydroxymethylacetophenone.

Methylresorcylic Acid.

See Dihydroxytoluic Acid and Orsellinic Acid.

Methylresorcylic Aldehyde.

See Dihydroxytoluic Aldehyde and Atranol.

Methylskatole.

See Dimethylindole.

 α -Methylstyryl bromide.

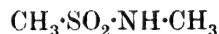
See 1-Bromo-2-phenylpropylene.

Methylsulphonylethylamine (*Mesylethylamine*)

$\text{C}_3\text{H}_9\text{O}_2\text{NS}$ MW, 123

B.p. 106–7°/0.3 mm. D^{24} 1.191. Misc. with H_2O .

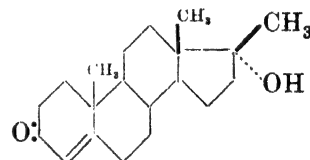
Helferich, Grünert, *Ber.*, 1940, 73, 1131.

Methylsulphonylmethylamine (*Mesylmethylamine*)

$\text{C}_2\text{H}_7\text{O}_2\text{NS}$ MW, 109

B.p. 118°/0.3 mm. D^{24} 1.275. Misc. with H_2O .

Helferich, Grünert, *Ber.*, 1940, 73, 1131.

17-Methyltestosterone

$\text{C}_{20}\text{H}_{30}\text{O}_2$ MW, 302

Needles from hexane- C_6H_6 . M.p. 165–6° corr. $[\alpha]_D^{20} + 82^\circ$ in EtOH.

Acetyl: cryst. from MeOH. M.p. 176–7° corr. $[\alpha]_D^{20} + 69^\circ$ in EtOH. *Semicarbazone*: needles from MeOH. Decomp. at 238°.

Propionyl: m.p. 146°. $[\alpha]_D^{25} - 74^\circ$ in EtOH. *Semicarbazone*: decomp. at 230°.

Semicarbazone: decomp. at 226°.

Ruzicka, Goldberg, Rosenberg, *Helv. Chim. Acta*, 1935, 18, 1487.

Fujii, Matsukawa, *J. Pharm. Soc. Japan*, 1935, 55, 1333.

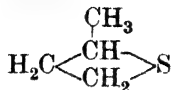
Kuwada, Miyasaka, *J. Pharm. Soc. Japan*, 1938, 58, 319.

Miescher, Klarer, *Helv. Chim. Acta*, 1939, 22, 962.

Oppenauer, *Rec. trav. chim.*, 1937, 56, 137.

Methyl tetrahydrobenzyl Ketone.

See Cyclohexenylacetone.

2-Methyltrimethylene sulphide $\text{C}_4\text{H}_8\text{S}$

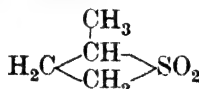
MW, 88

B.p. 105.5–107.5°/747 mm. Sol. most org. solvents. Insol. H_2O . D_4^{20} 0.9571. n_D^{20} 1.4831. Volatile in steam.

B, HgCl_2 : cryst. Decomp. at 106°. Spar. sol. usual solvents.

Grischkewitsch-Trochimowski, *J. Russ.*

Phys.-Chem. Soc., 1916, 48, 894.

2-Methyltrimethylene sulphone $\text{C}_4\text{H}_8\text{O}_2\text{S}$

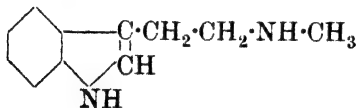
MW, 120

B.p. 251.5–253.5° corr. Sol. H_2O , EtOH, Et_2O . D_4^{25} 1.2174. $n_D^{16.5}$ 1.4700. Bitter taste.

See previous reference.

3-Methyltriphenylamine.

See Diphenyl-*m*-toluidine.

N-Methyltryptamine (3-[ω -Methylaminoethyl]-indole) $\text{C}_{11}\text{H}_{14}\text{N}_2$

MW, 174

Cryst. M.p. 90°.

B, HCl : m.p. 180°.

Benzoyl: needles. M.p. 117°.

m-Chlorobenzoyl: prisms. M.p. 153°.

p-Nitrobenzoyl: golden yellow plates. M.p. 134°.

Phenylcarbamyl deriv.: m.p. 153°.

Picrate: m.p. 191°.

Manske, *Chem. Abstracts*, 1932, 72, 625.

Methylundecanol.

See Isopropyl octylcarbinol and Dimethylnonylcarbinol.

2-Methylundecanone-3.

See Isopropyl octyl Ketone.

p-Methylvalerophenone.

See Butyl *p*-tolyl Ketone.

Methylvinylacetylene.

See Propenylacetylene and Isopropenylacetylene.

Methylvinylcarbinol (1-Methylallyl alcohol, 1-butenol-3)

 $\text{C}_4\text{H}_8\text{O}$

MW, 72

B.p. 96–8° D_4^{20} 0.854, D_4^{20} 0.8318. n_D 1.41275.

Acetyl: b.p. 112–14°/766 mm. $n_{\text{D}}^{15.8}$ 1.4065.

Trichloroacetyl: b.p. 69.5–70.5°/8 mm. $n_{\text{D}}^{19.461}$ 1.4639.

Hydrogen phthaloyl: *dl*-. Cryst. from ligroin.

M.p. 5°. *l*-. Cryst. from ligroin. M.p. 52–3°.

$[\alpha]_D - 40.6^\circ$ in EtOH. *d*-. Cryst. from ligroin.

M.p. 52–3°. $[\alpha]_D + 40.5^\circ$ in EtOH.

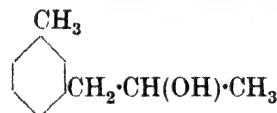
p-Nitrobenzoyl: needles from EtOH. M.p. 43–4°.

Allophanate: m.p. 151–2°.

Delaby, *Bull. soc. chim.*, 1923, 33, 602.

Claisen, *Tietze, Ber.*, 1926, 59, 2348.

Kenyon, Snellgrove, *J. Chem. Soc.*, 1925, 127, 1174.

Methyl-*m*-xylylcarbinol (β -Hydroxy-*m*-propyltoluene, 1-*m*-tolylisopropyl alcohol) $\text{C}_{10}\text{H}_{14}\text{O}$

MW, 150

B.p. 119–20°/18 mm.

Acetyl: b.p. 116–17°/20 mm.

Carré, *Bull. soc. chim.*, 1909, 5, 487.

Auwers, Lechner, Bundesmann, *Ber.*, 1925, 58, 47.

Mitraphyline.

See Rubradinine.

Mitraspecine $\text{C}_{28}\text{H}_{36}\text{O}_5\text{N}_2$

MW, 480

Alkaloid from bark of *Mitragyna speciosa*, Korthals. Monoclinic platelets from EtOH.

M.p. 244–5°. Sol. Me_2CO , C_6H_6 . Mod. sol.

Et_2O . $[\alpha]_D^{25} - 59.15^\circ$ in CHCl_3 .

Picrate: m.p. 136°.

Denis, *Chem. Abstracts*, 1939, 33, 1741.

Monocrotaline $\text{C}_{16}\text{H}_{23}\text{O}_6\text{N}$

MW, 325

Alkaloid from *Crotalaria spectabilis* and *C. retusa*. Prisms from EtOH. M.p. 197–8° corr. decomp. $[\alpha]_D^{25} - 54.7^\circ$ in CHCl_3 .

Hydrochloride: prisms from $\text{MeOH-Et}_2\text{O}$. M.p. 184° corr. decomp. $[\alpha]_D^{25} - 38.4^\circ$ in H_2O .

Methiodide: prisms from MeOH-CHCl_3 . M.p. 205° corr. decomp. $[\alpha]_D^{25} + 23.4^\circ$ in MeOH .

Adams, Rogers, *J. Am. Chem. Soc.*, 1939, 61, 2817.

Neal, Rusoff, Ahmann, *J. Am. Chem. Soc.*, 1935, 57, 2560.

Morellin

$C_{30}H_{34}O_6$ MW, 490

Constituent of seeds of *Garcinia morella*. Yellow needles or rhombic prisms from MeOH or EtOH. M.p. 154°. Insol. H_2O , ligroin. $[\alpha]_D - 594^\circ$ in $CHCl_3$.

Tetra-acetyl: yellow prisms from MeOH. M.p. 178-9°. $[\alpha]_D - 327^\circ$ in $CHCl_3$.

Di-Me ether: $C_{32}H_{38}O_6$. MW, 518. Yellow prisms from MeOH. M.p. 156°. $[\alpha]_D - 242^\circ$ in $CHCl_3$. *Dioxime*: amorphous powder from EtOH.Aq. M.p. 118°. $[\alpha]_D + 241^\circ$ in $CHCl_3$.

Tri-Me ether: $C_{33}H_{40}O_6$. MW, 532. Microcryst. yellow powder from C_6H_6 -pet. ether. M.p. 170-2°.

Dioxime: yellow powder. M.p. 148-9°.

Mononitroguanylhdyrazone: yellow prisms from EtOH-AcOEt. Decomp. at 205.5°. $[\alpha]_D - 748^\circ$ in $CHCl_3$.

Rao, *J. Chem. Soc.*, 1937, 853.

Muscadinin chloride

$C_{28}H_{33}O_{17}Cl$ MW, 676.5

Anthocyanin from Hunt muscadine grape. Coppery-brown cryst. from 0.5% HCl. M.p. 184° decomp. after sintering at 181°. Reduces Fehling's in cold. $FeCl_3 \rightarrow$ violet col.

Brown, *J. Am. Chem. Soc.*, 1940, 62, 2808.

Mycolic Acid

$C_{88}H_{172}O_4$ or $C_{88}H_{176}O_4$ MW, 1292 or 1296

Constituent of wax of human tubercle bacillus. Pptd from Et_2O sol. with EtOH. M.p. 54-6° corr. $[\alpha]_D^{25} + 1.8^\circ$ in $CHCl_3$. Heat. at 300-50° \rightarrow hexacosanic acid.

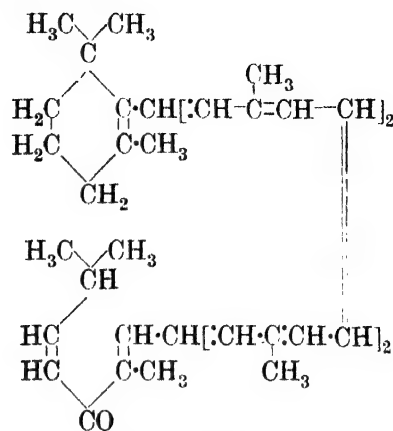
Me ester: amorphous powder. M.p. 43-5°.

Lesuk, Anderson, *J. Biol. Chem.*, 1940, 136, 603.

Stodola, Lesuk, Anderson, *J. Biol. Chem.*, 1938, 126, 505.

Myrystyl-

See Tetradecyl-

Myxoxanthin

Suggested structure

$C_{40}H_{55}O$

MW, 551

Characteristic pigment of the *Myxophyceae*. Violet prisms from Py-MeOH. M.p. 168-9°. (Berl block, evac. tube). Sol. Et_2O , $CHCl_3$, pet. ether. Insol. MeOH. Absorption maxima: 4880 Å. in CS_2 , 4730 Å. in $CHCl_3$, 4700 Å. in EtOH, 4560 Å. in ligroin.

Oxime: vermilion plates from Py-MeOH. M.p. 195-6° (Berl block, evac. tube). Broad absorption band in $CHCl_3$ with head at 4630 Å.

Heilbron, Lythgoe, *J. Chem. Soc.*, 1936, 1376.

Myxoxanthophyll

$C_{40}H_{56}O_7(\pm 2H)$

MW, 648

Carotenoid from *Oscillatoria rubescens*. Violet needles from Me_2CO . M.p. 169-70°. Sol. EtOH, Py. Mod. sol. $CHCl_3$, Me_2CO . Insol. Et_2O , CS_2 , pet. ether. C_6H_6 . $[\alpha]_{0.1} - 255^\circ$ in EtOH. Absorption maxima in $CHCl_3$: 5180, 4845, 4500 Å.

Heilbron, Lythgoe, *J. Chem. Soc.*, 1936, 1376.

Printed in England for
Eyre and Spottiswoode (Publishers) Ltd.
15, Bedford Street, Strand, London, W.C.2

1 NOV
DATE OF ISSUE

This book must be returned
within 3, 7, 14 days of its issue. A
fine of ONE ANNA per day will
be charged if the book is overdue.

NOV

--

